Spirent Data

Test Reference

User Manual

Spirent

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This manual applies to Spirent Data: Version 2.60 or higher.

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Table of Contents

1. Introduction

1.1. Overview

Spirent Data provides an expandable and integrated test solution for verifying the operation of applications and advanced features of Third Generation (3G) CDMA mobile devices. The data performance protocols and air interface specifications are defined in 3GPP2 industry standards. Performance testing includes 1X data performance, Mobile IP, and EV-DO data performance.

The typical hardware configuration for Spirent Data includes the Spirent EV-DO Network Emulator SR3462, two CDMA 1X Network Emulators, an SR5078 Test Configuration Unit, SR5500 Wireless Channel Emulator, PDSN emulator SR3610, Application Server SR3920, Controller/Host PC, and a Data Client laptop. The diagram shown in Figure 1-1 represents a typical test setup utilized in Spirent Data.

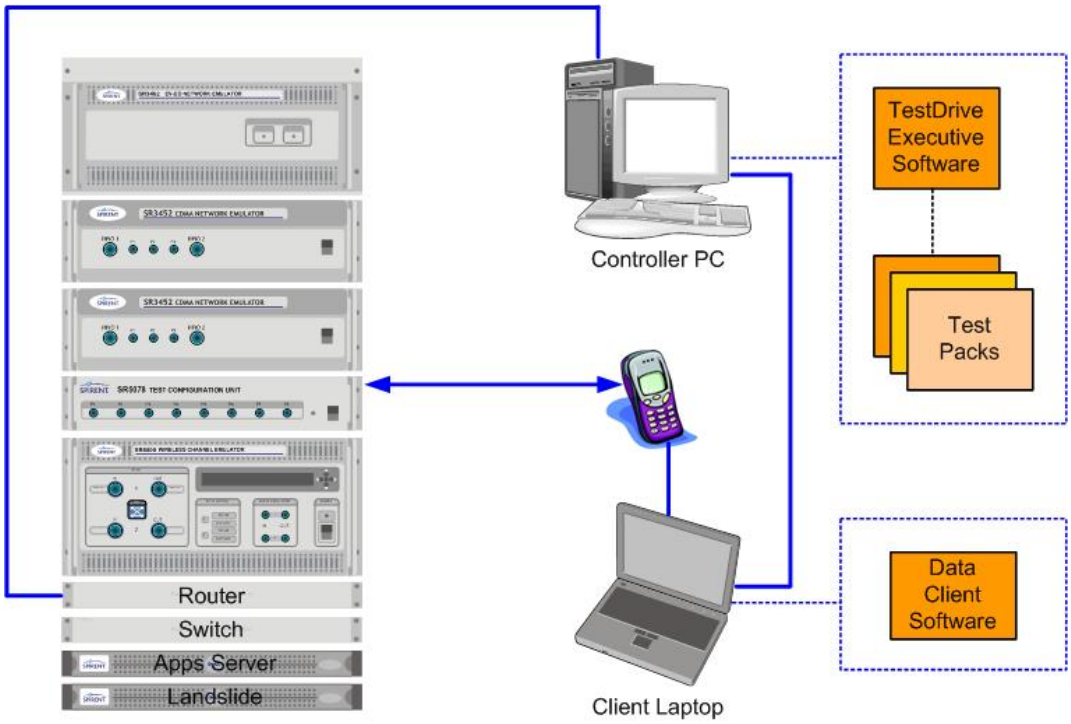


Figure 1-1: Spirent Data Test Setup

Spirent Data software automates data performance testing by configuring the instruments, stepping through the test sequences, and logging the results. By removing much of the burden of manual test setup and configuration, Spirent Data solves the following testing issues:

- Selecting the correct instruments and necessary system hardware.
- Translating the test standards into instrument settings.
- Writing software to automate test sequences.
- Logging test results.
- Reproducing test set-up configurations.

Spirent Data allows wireless service providers, equipment manufacturers, and developers to evaluate 3G mobile products relative to industry-standard test requirements and user-defined test conditions.

2. Test Reference

2.1. Overview

This Chapter provides reference information that describes the algorithms implemented during test execution.

The information is grouped into the following sub-sections:

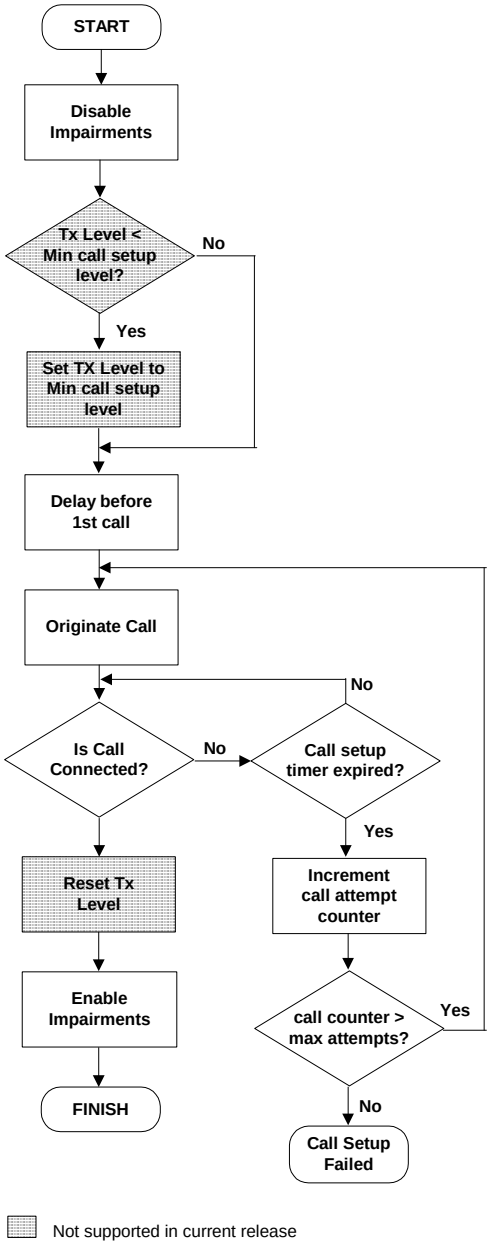
- Common Test Algorithms
- Test Details
- Description of Common Test Parameters
- Description of Common Test Results
- List of Test Cases and Suites

2.2. Common Test Algorithms

This Section describes test algorithms used during the execution of all tests.

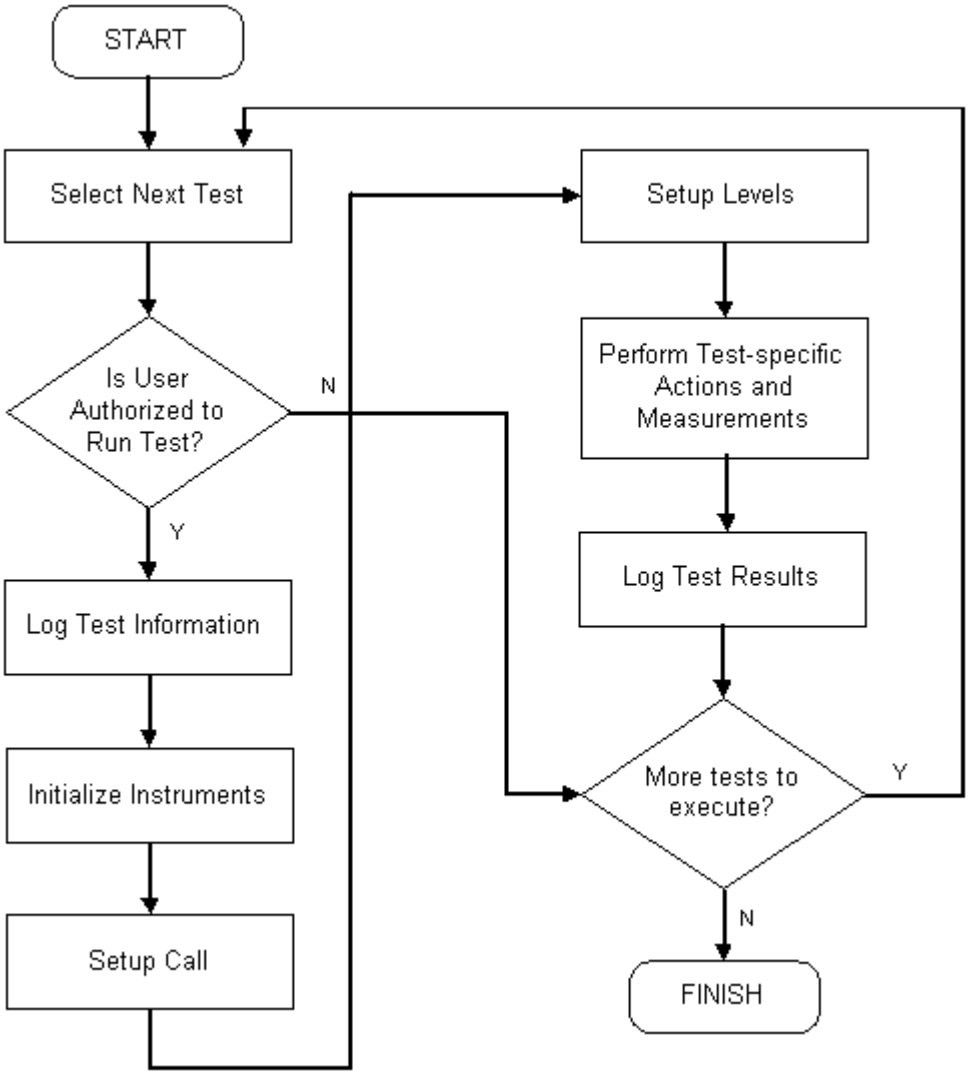
2.2.1. Call Setup

For most tests, Spirent Data attempts to set up a call using the algorithm depicted below. If the call setup procedure fails, the test is categorized as “Undetermined” and the test executive continues to the next test in the suite.



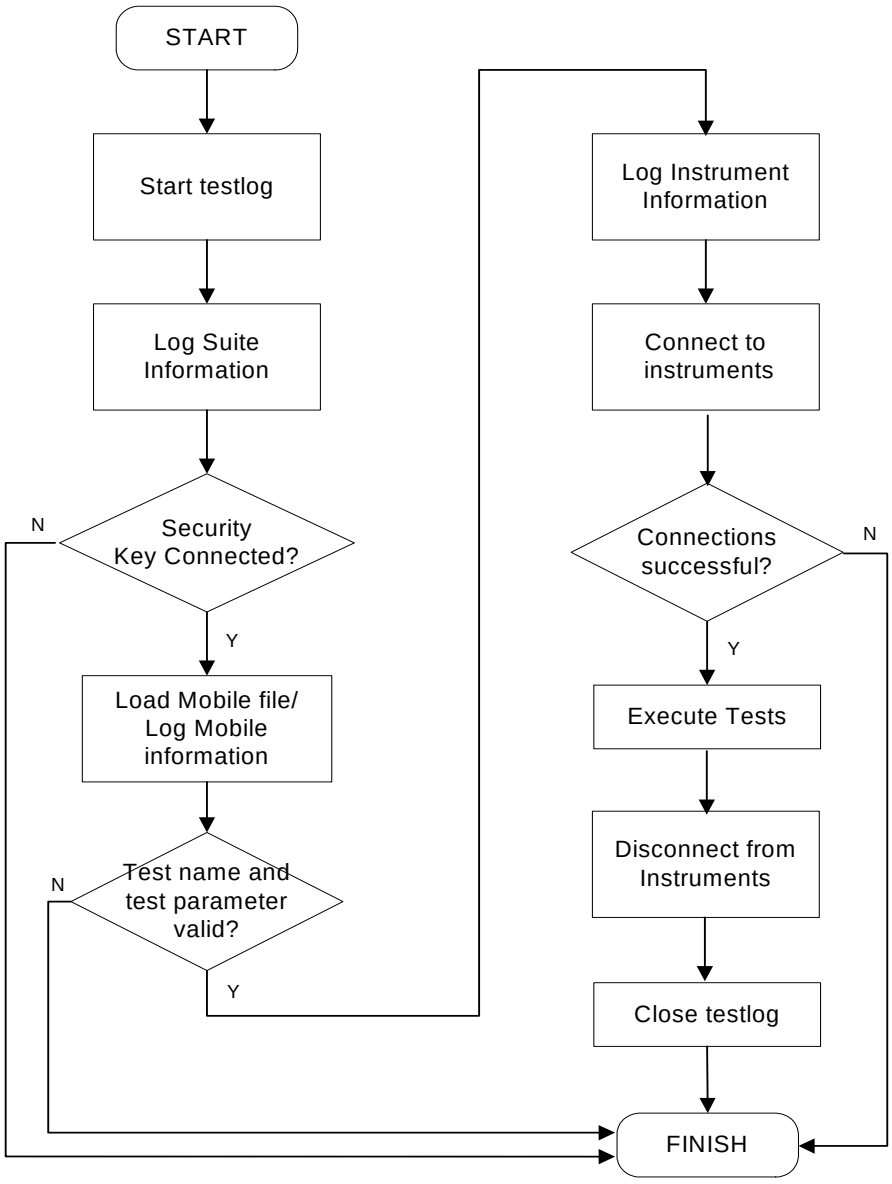
2.2.2. Test Execution

The flowchart below details the sequence of operations performed during the execution of a single test within a test suite. Details of the call setup algorithm are presented in Section 2.2.1 of this manual. Details of the test-specific actions and measurements are presented in the associated test in Section 2.3 of this manual.



2.2.3. Suite Execution

The flowchart below details the sequence of operations performed during test suite execution.



2.3. Test Details

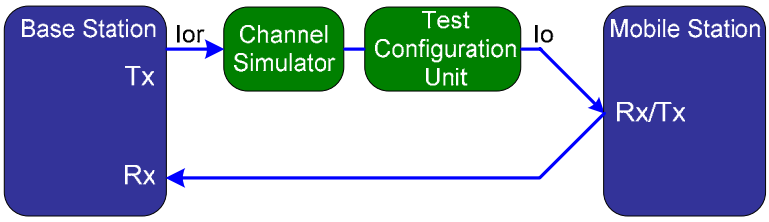
This section provides details of each test currently supported by Spirent Data. Each sub-section includes the following information:

- Diagram of Test Setup.
- Description of Test Operation.
- List of Required Instruments used to perform the test.
- Description of Test Parameters. Test-specific parameters are documented in the same section as their associated tests.
  Common test parameters are documented in Section 2.10 of this manual.
- Description of Test Results. Test-specific results are documented in the same section as their associated tests.
  Common test results are documented in Section 2.14 of this manual.
- Description of the Test Algorithm.

2.4. 1X Data Retry Test Cases

2.4.1. 1X Positive Data Call

2.4.1.1 Hardware Configuration



2.4.1.2 Description

- 2.11 Positive Data Call – This test case is a positive data call to verify all device provisioning and network elements are set up correctly before testing begins.

2.4.1.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description
Application Parameters	• Application Type
Network Parameters	• IP Negotiation Type
Pass/Fail Criteria	• Data Call Connected

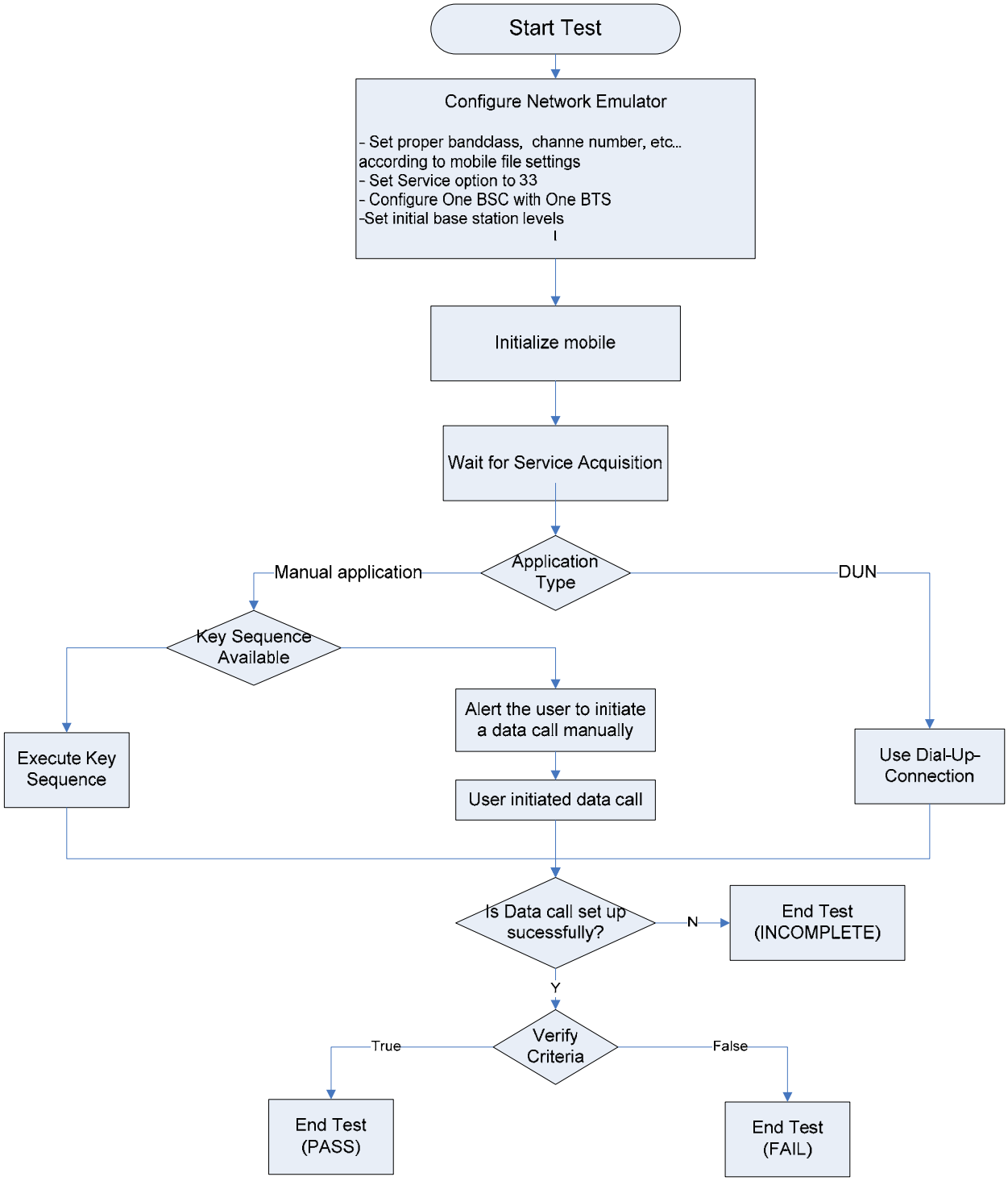
2.4.1.4 Test Results

The following test results are supported for this test:

- Data Call Connected

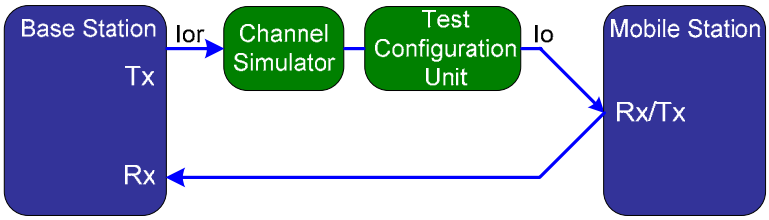
2.4.1.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.4.2. 1X Data Retry Failure

2.4.2.1 Hardware Configuration



2.4.2.2 Description

There are several different test conditions for Data Retry Failure tests:

- 2.12 Service Option 33 Not Provisioned For User – This test case verifies the reaction of a device when it has not been provisioned for 3G-1X data on the subscriber/switch/HLR side.
- 2.13 AAA Server Access Not Provisioned For User – This test case verifies the reaction of a device when it has not been provisioned for 3G-1X/EV-DO data subscriber side by removing/disabling access through the AAA server.
- 2.14 CDMA Authentication (AKEY) Mismatch For User – This test case verifies a device's reaction when it has been improperly provisioned and there is a mismatch with its CDMA authentication (AKEY).
- 2.15 MIN/ESN Mismatch For User – This test case verifies a device's reaction when the MIN/ESN or MIN/MEID has been improperly provisioned by not being set-up as a legitimate user on a system.
- 2.16 No Service Option 33 Data Available At The Base Station – The test case verifies a device's reaction when it encounters a base station that does not have service option 33 turned on but 1XRTT voice service is available. Service option 12 is available on the network/base station though.
- 2.19 Simulate BSC 1 Busy and BSC 2 Available – This test case verifies a device's reaction when it encounters a base station that does not have any available traffic channels for service option 33/EV-DO data call on the carrier where the data call was initiated. When the unit under test encounters the busy carrier, it should hand-off and connect on the second carrier if the network redirects it to that second carrier.
- 2.20 Simulated Busy or Unavailable AAA Server – This test case verifies a device's reaction when the AAA server is busy or unavailable during a service option 33/EV-DO data call.

2.4.2.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description
Application Parameters	• Application Type • BSC Data Retry Failure Method • ORDQ • Retry Type • Retry Timer Value (sec or ms) • MIP Data Retry Failure Method • FA/HA User Defined Response Code • SIP Data Retry Failure Method • Retry Test Time Duration (Min)
Network Parameters	• BSC Configuration • IP Negotiation Type
Pass/Fail Criteria	• Originations • Test Condition

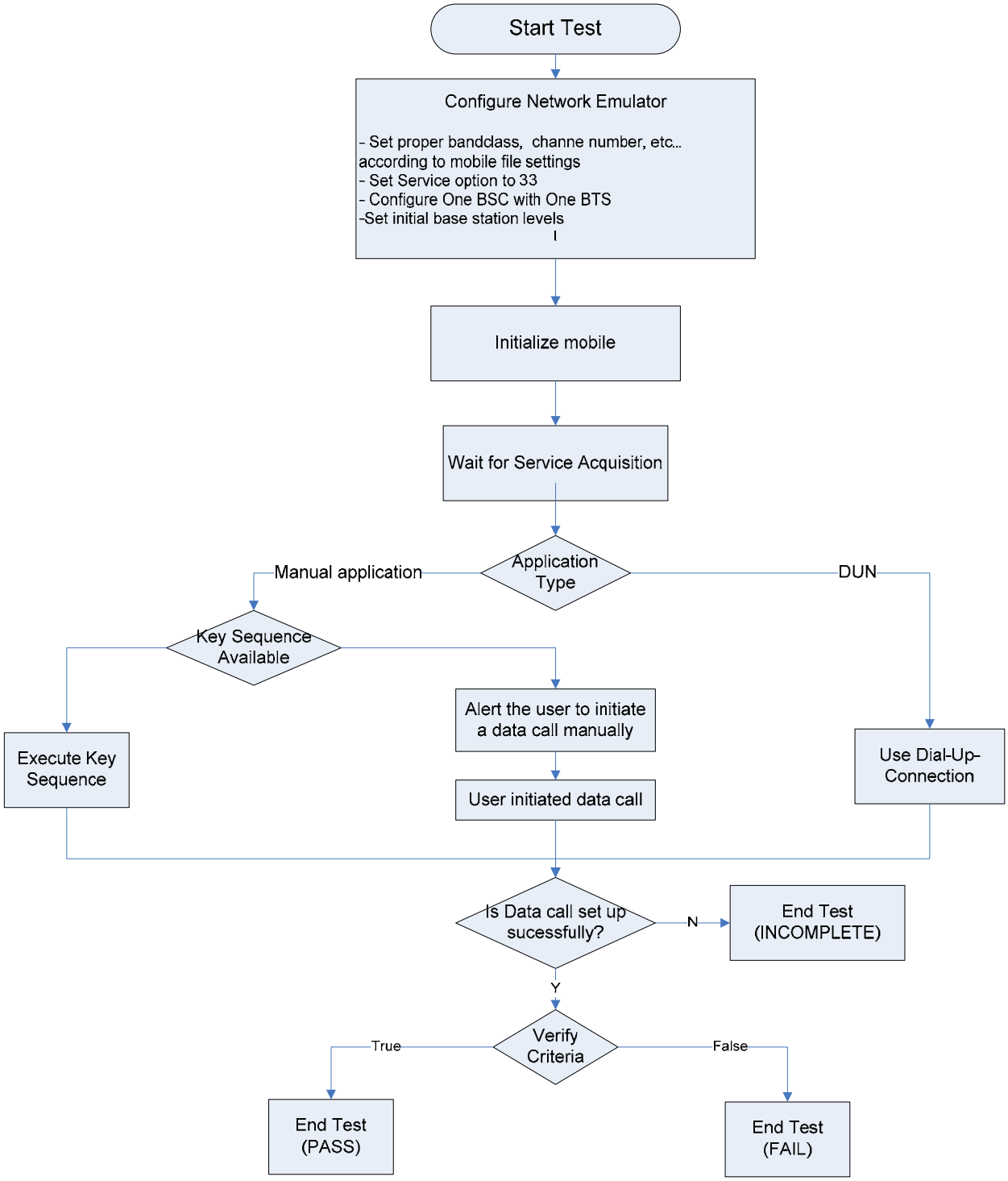
2.4.2.4 Test Results

The following test results are supported for this test:

- Origination Retries

2.4.2.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.4.3. Spirent Sample Test Suites – 1X Data Retry

2.4.3.1 1X Test Cases

Automatic Embedded Applications

Test Suite #1

1X Automatic Applications (MIPP) – All Tests		
Test #	Test Name	Test Description
1	1X Positive Data Call	Positive Data Call – Automatic
2	1X Data Retry Failure	Service Option 33 Not Provisioned For User – Automatic
3	1X Data Retry Failure	AAA Server Access Not Provisioned For User – Automatic
4	1X Data Retry Failure	CDMA Authentication (AKEY) Mismatch For User – Automatic
5	1X Data Retry Failure	MIN/ESN Mismatch For User – Automatic
6	1X Data Retry Failure	No Service Option 33 Data Available At The Base Station – Automatic
7	1X Data Retry Failure	Simulate BSC 1 Busy and BSC 2 Available – Automatic
8	1X Data Retry Failure	Simulated Busy Or Unavailable AAA Server – Automatic

Test Suite #2

1X Automatic Applications (SIP) – All Tests		
Test #	Test Name	Test Description
1	1X Positive Data Call	Positive Data Call – Automatic
2	1X Data Retry Failure	Service Option 33 Not Provisioned For User – Automatic
3	1X Data Retry Failure	AAA Server Access Not Provisioned For User – Automatic
4	1X Data Retry Failure	CDMA Authentication (AKEY) Mismatch For User – Automatic
5	1X Data Retry Failure	MIN/ESN Mismatch For User – Automatic
6	1X Data Retry Failure	No Service Option 33 Data Available At The Base Station – Automatic
7	1X Data Retry Failure	Simulate BSC 1 Busy and BSC 2 Available – Automatic
8	1X Data Retry Failure	Simulated Busy Or Unavailable AAA Server – Automatic

Manual Embedded Applications

Test Suite #1

1X Manual Applications (MIPP) – All Tests		
Test #	Test Name	Test Description
1	1X Positive Data Call	Positive Data Call – Brew
2	1X Positive Data Call	Positive Data Call – WAP
3	1X Positive Data Call	Positive Data Call – MMS
4	1X Data Retry Failure	Service Option 33 Not Provisioned For User – Brew
5	1X Data Retry Failure	Service Option 33 Not Provisioned For User – WAP
6	1X Data Retry Failure	Service Option 33 Not Provisioned For User – MMS
7	1X Data Retry Failure	AAA Server Access Not Provisioned For User – Brew
8	1X Data Retry Failure	AAA Server Access Not Provisioned For User – WAP
9	1X Data Retry Failure	AAA Server Access Not Provisioned For User – MMS
10	1X Data Retry Failure	CDMA Authentication (AKEY) Mismatch For User – Brew
11	1X Data Retry Failure	CDMA Authentication (AKEY) Mismatch For User – WAP
12	1X Data Retry Failure	CDMA Authentication (AKEY) Mismatch For User – MMS
13	1X Data Retry Failure	MIN/ESN Mismatch For User – Brew
14	1X Data Retry Failure	MIN/ESN Mismatch For User – WAP
15	1X Data Retry Failure	MIN/ESN Mismatch For User – MMS
16	1X Data Retry Failure	No Service Option 33 Data Available At The Base Station – Brew
17	1X Data Retry Failure	No Service Option 33 Data Available At The Base Station – WAP
18	1X Data Retry Failure	No Service Option 33 Data Available At The Base Station – MMS
19	1X Data Retry Failure	Simulate BSC 1 Busy and BSC 2 Available – Brew
20	1X Data Retry Failure	Simulate BSC 1 Busy and BSC 2 Available – WAP
21	1X Data Retry Failure	Simulate BSC 1 Busy and BSC 2 Available – MMS
22	1X Data Retry Failure	Simulated Busy Or Available AAA Server – Brew
23	1X Data Retry Failure	Simulated Busy Or Available AAA Server – WAP
24	1X Data Retry Failure	Simulated Busy Or Available AAA Server – MMS

Test Suite #2

1X Manual Applications (SIP) – All Tests		
Test #	Test Name	Test Description
1	1X Positive Data Call	Positive Data Call – Brew
2	1X Positive Data Call	Positive Data Call – WAP
3	1X Positive Data Call	Positive Data Call – MMS
4	1X Data Retry Failure	Service Option 33 Not Provisioned For User – Brew
5	1X Data Retry Failure	Service Option 33 Not Provisioned For User – WAP
6	1X Data Retry Failure	Service Option 33 Not Provisioned For User – MMS
7	1X Data Retry Failure	AAA Server Access Not Provisioned For User – Brew
8	1X Data Retry Failure	AAA Server Access Not Provisioned For User – WAP
9	1X Data Retry Failure	AAA Server Access Not Provisioned For User – MMS
10	1X Data Retry Failure	CDMA Authentication (AKEY) Mismatch For User – Brew
11	1X Data Retry Failure	CDMA Authentication (AKEY) Mismatch For User – WAP
12	1X Data Retry Failure	CDMA Authentication (AKEY) Mismatch For User – MMS
13	1X Data Retry Failure	MIN/ESN Mismatch For User – Brew
14	1X Data Retry Failure	MIN/ESN Mismatch For User – WAP
15	1X Data Retry Failure	MIN/ESN Mismatch For User – MMS
16	1X Data Retry Failure	No Service Option 33 Data Available At The Base Station – Brew
17	1X Data Retry Failure	No Service Option 33 Data Available At The Base Station – WAP
18	1X Data Retry Failure	No Service Option 33 Data Available At The Base Station – MMS
19	1X Data Retry Failure	Simulate BSC 1 Busy and BSC 2 Available – Brew
20	1X Data Retry Failure	Simulate BSC 1 Busy and BSC 2 Available – WAP
21	1X Data Retry Failure	Simulate BSC 1 Busy and BSC 2 Available – MMS
22	1X Data Retry Failure	Simulated Busy Or Available AAA Server – Brew
23	1X Data Retry Failure	Simulated Busy Or Available AAA Server – WAP
24	1X Data Retry Failure	Simulated Busy Or Available AAA Server – MMS

Remote Devices

Test Suite #1

1X Remote Devices (MIPP) – All Tests		
Test #	**Test Name**	**Test Description**
1	1X Positive Data Call	Positive Data Call – Remote
2	1X Data Retry Failure	Service Option 33 Not Provisioned For User – Remote
3	1X Data Retry Failure	AAA Server Access Not Provisioned For User – Remote
4	1X Data Retry Failure	CDMA Authentication (AKEY) Mismatch For User – Remote
5	1X Data Retry Failure	MIN/ESN Mismatch For User – Remote
6	1X Data Retry Failure	No Service Option 33 Data Available At The Base Station – Remote
7	1X Data Retry Failure	Simulate BSC 1 Busy and BSC 2 Available – Remote
8	1X Data Retry Failure	Simulated Busy Or Unavailable AAA Server – Remote

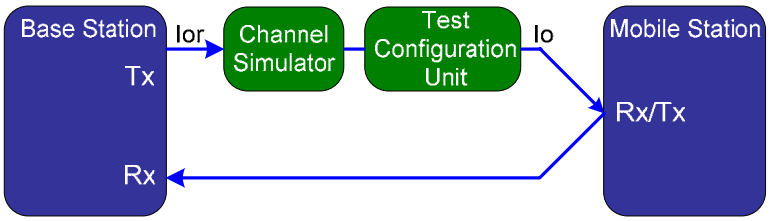
Test Suite #2

1X Remote Devices (SIP) – All Tests		
Test #	**Test Name**	**Test Description**
1	1X Positive Data Call	Positive Data Call – Remote
2	1X Data Retry Failure	Service Option 33 Not Provisioned For User – Remote
3	1X Data Retry Failure	AAA Server Access Not Provisioned For User – Remote
4	1X Data Retry Failure	CDMA Authentication (AKEY) Mismatch For User – Remote
5	1X Data Retry Failure	MIN/ESN Mismatch For User – Remote
6	1X Data Retry Failure	No Service Option 33 Data Available At The Base Station – Remote
7	1X Data Retry Failure	Simulate BSC 1 Busy and BSC 2 Available – Remote
8	1X Data Retry Failure	Simulated Busy Or Unavailable AAA Server – Remote

2.5. EV-DO Data Retry Test Cases

2.5.1. EV-DO Positive Data Call

2.5.1.1 Hardware Configuration



2.5.1.2 Description

- **2.11 Positive Data Call** – This test case is a positive data call to verify that all device provisioning and network elements are set up correctly before testing begins.

2.5.1.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description
Application Parameters	• Application Type
Network Parameters	• IP Negotiation Type • EV-DO Revision • EV-DO Packet Type Configuration
Pass/Fail Criteria	• Data Call Connected

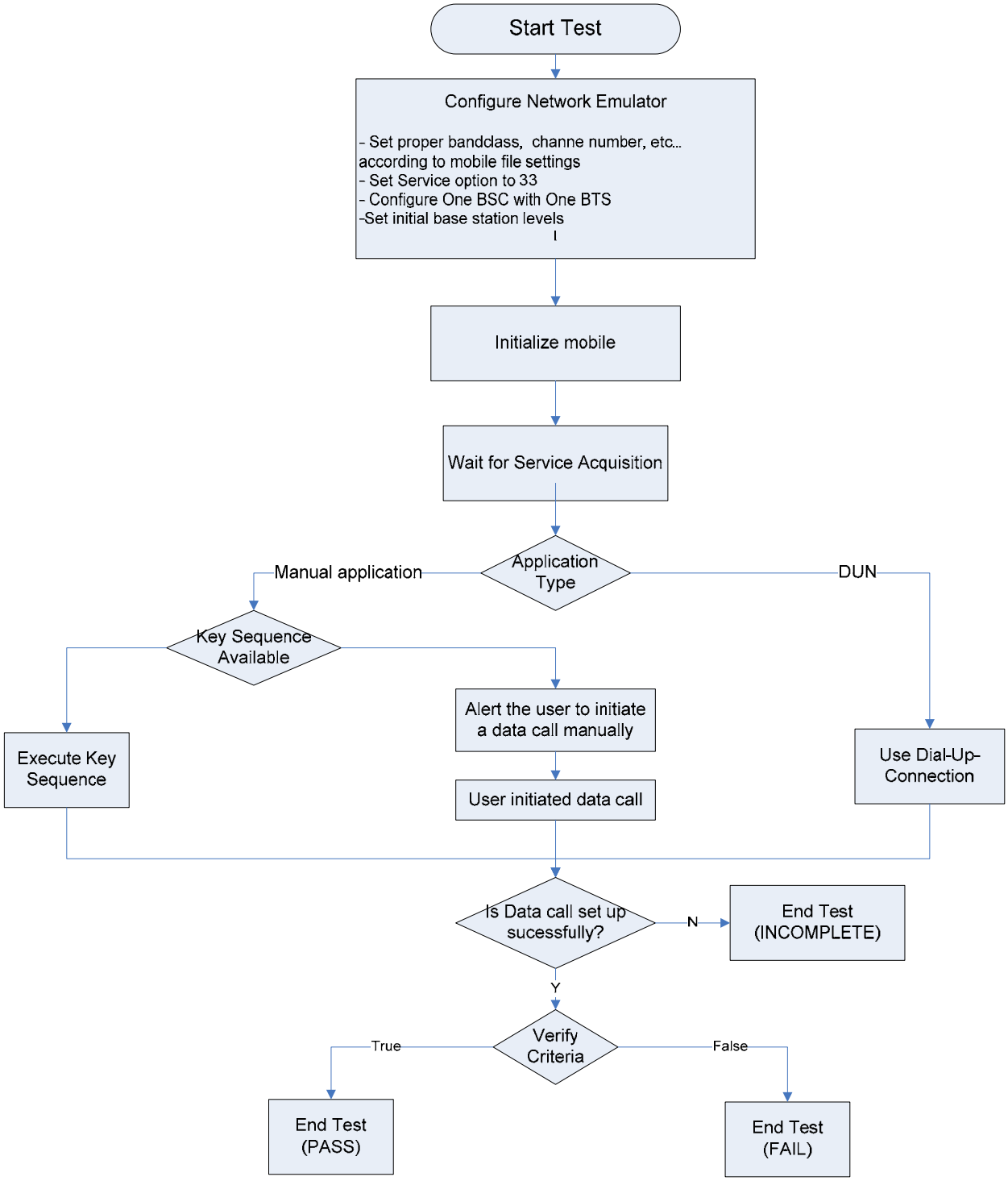
2.5.1.4 Test Results

The following test results are supported for this test:

- Data Call Connected

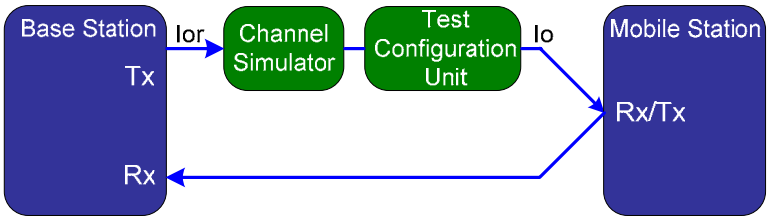
2.5.1.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.5.2. EV-DO Data Retry Failure

2.5.2.1 Hardware Configuration



2.5.2.2 Description

There are several different test conditions for Data Retry Failure tests:

- **2.13 AAA Server Access Not Provisioned For User** – This test case verifies a device's reaction when it has not been provisioned for 3G-1X/EV-DO data subscriber side by removing/disabling access through the AAA server.
- **2.19 Simulate AN 1 Busy and BSC 1 Available** – This test case verifies a device's reaction when it encounters a base station that does not have any available traffic channels for service option 33/EV-DO data call on the carrier where the data call was initiated. When the unit under test encounters the busy carrier, it should hand-off and connect on the second carrier if the network redirects it to that second carrier.
- **2.20 Simulated Busy or Unavailable AAA Server** – This test case verifies a device's reaction when the AAA server is busy or unavailable during a service option 33/EV-DO data call.

2.5.2.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description
Application Parameters	• Application Type • AN Data Retry Failure Method • MIP Data Retry Failure Method • SIP Data Retry Failure Method • Deny Reason • FA/HA User Defined Response Code • Retry Test Time Duration (Min)
Network Parameters	• IP Negotiation Type • EV-DO Revision • EV-DO Packet Type Configuration
Pass/Fail Criteria	• Connection Requests Retries • Originations Retries • Test Condition

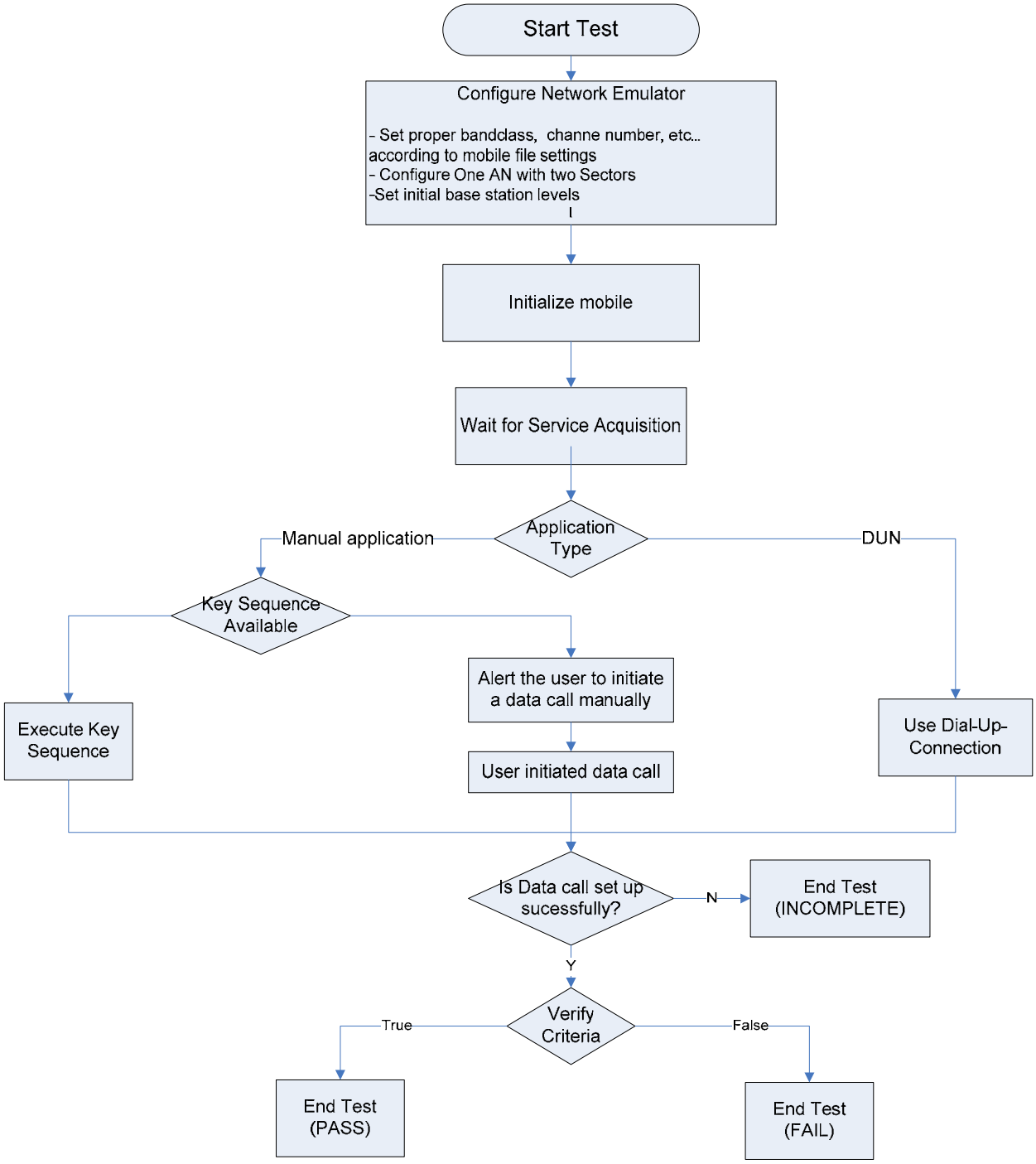
2.5.2.4 Test Results

The following test results are supported for this test:

- Origination Retries
- Connection Requests Retries

2.5.2.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.5.3. Spirent Sample Test Suites – EV-DO Data Retry

2.5.3.1 EV-DO Test Cases

Automatic Embedded Applications

Test Suite #1

EV-DO Automatic Applications (MIPP) – All Tests		
Test #	**Test Name**	**Test Description**
1	EV-DO Positive Data Call	Positive Data Call – Automatic
2	EV-DO Data Retry Failure	AAA Server Access Not Provisioned For User – Automatic
3	EV-DO Data Retry Failure	Simulate AN 1 Busy and BSC 1 Available – Automatic
4	EV-DO Data Retry Failure	Simulated Busy Or Unavailable AAA Server – Automatic

Test Suite #2

EV-DO Automatic Applications (SIP) – All Tests		
Test #	**Test Name**	**Test Description**
1	EV-DO Positive Data Call	Positive Data Call – Automatic
2	EV-DO Data Retry Failure	AAA Server Access Not Provisioned For User – Automatic
3	EV-DO Data Retry Failure	Simulate AN 1 Busy and BSC 1 Available – Automatic
4	EV-DO Data Retry Failure	Simulated Busy Or Unavailable AAA Server – Automatic

Manual Embedded Applications

Test Suite #1

EV-DO Automatic Applications (MIPP) – All Tests		
Test #	**Test Name**	**Test Description**
1	EV-DO Positive Data Call	Positive Data Call – Brew
2	EV-DO Positive Data Call	Positive Data Call – WAP
3	EV-DO Positive Data Call	Positive Data Call – MMS

EV-DO Automatic Applications (MIPP) – All Tests		
4	EV-DO Data Retry Failure	AAA Server Access Not Provisioned For User – Brew
5	EV-DO Data Retry Failure	AAA Server Access Not Provisioned For User – WAP
6	EV-DO Data Retry Failure	AAA Server Access Not Provisioned For User – MMS
7	EV-DO Data Retry Failure	Simulate AN 1 Busy and BSC 1 Available – Brew
8	EV-DO Data Retry Failure	Simulate AN 1 Busy and BSC 1 Available – WAP
9	EV-DO Data Retry Failure	Simulate AN 1 Busy and BSC 1 Available – MMS
10	EV-DO Data Retry Failure	Simulated Busy Or Unavailable AAA Server – Brew
11	EV-DO Data Retry Failure	Simulated Busy Or Unavailable AAA Server – WAP
12	EV-DO Data Retry Failure	Simulated Busy Or Unavailable AAA Server – MMS

Test Suite #2

EV-DO Automatic Applications (SIP) – All Tests		
Test #	Test Name	Test Description
1	EV-DO Positive Data Call	Positive Data Call – Brew
2	EV-DO Positive Data Call	Positive Data Call – WAP
3	EV-DO Positive Data Call	Positive Data Call – MMS
4	EV-DO Data Retry Failure	AAA Server Access Not Provisioned For User – Brew
5	EV-DO Data Retry Failure	AAA Server Access Not Provisioned For User – WAP
6	EV-DO Data Retry Failure	AAA Server Access Not Provisioned For User – MMS
7	EV-DO Data Retry Failure	Simulate AN 1 Busy and BSC 1 Available – Brew
8	EV-DO Data Retry Failure	Simulate AN 1 Busy and BSC 1 Available – WAP
9	EV-DO Data Retry Failure	Simulate AN 1 Busy and BSC 1 Available – MMS
10	EV-DO Data Retry Failure	Simulated Busy Or Unavailable AAA Server – Brew

EV-DO Automatic Applications (SIP) – All Tests		
11	EV-DO Data Retry Failure	Simulated Busy Or Unavailable AAA Server – WAP
12	EV-DO Data Retry Failure	Simulated Busy Or Unavailable AAA Server – MMS

Remote Devices

Test Suite #1

EV-DO Remote Devices (MIPP) – All Tests		
Test #	Test Name	Test Description
1	EV-DO Positive Data Call	Positive Data Call – Remote
2	EV-DO Data Retry Failure	AAA Server Access Not Provisioned For User – Remote
3	EV-DO Data Retry Failure	Simulate AN 1 Busy and BSC 1 Available – Remote
4	EV-DO Data Retry Failure	Simulated Busy Or Unavailable AAA Server – Remote

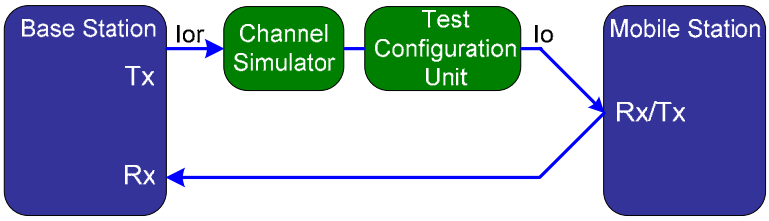
Test Suite #2

EV-DO Remote Devices (SIP) – All Tests		
Test #	Test Name	Test Description
1	EV-DO Positive Data Call	Positive Data Call – Remote
2	EV-DO Data Retry Failure	AAA Server Access Not Provisioned For User – Remote
3	EV-DO Data Retry Failure	Simulate AN 1 Busy and BSC 1 Available – Remote
4	EV-DO Data Retry Failure	Simulated Busy Or Unavailable AAA Server – Remote

2.6. 1X Data Throughput Test Cases

2.6.1. 1X Channel Setup and Teardown Time

2.6.1.1 Hardware Configuration



NOTE: The Channel Simulator is optional for this test.

2.6.1.2 Description

This test measures and verifies that the air interface channel setup, teardown, and dormancy times for a packet data call do not exceed the tolerance that is specified in the test. Measurements can be taken when the mobile device transitions between Idle and Active state or between Dormant and Active state. The service setup and negotiation times will also be measured and verified.

2.6.1.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Network Parameters	• IP Negotiation Type
Levels	• Ior (dBm/1.23MHz)
AirAccess Data Parameters	• RLP Frame Type • Forward Data Rate Multiplier • Forward SCH Coding • Reverse Data Rate Multiplier • Reverse SCH Coding
Test Details Parameters	• Test State
Test Criteria	• Service Setup Time (sec) • Channel Setup Time (sec) • Service Negotiation Time (sec) • Channel Teardown Time (sec)

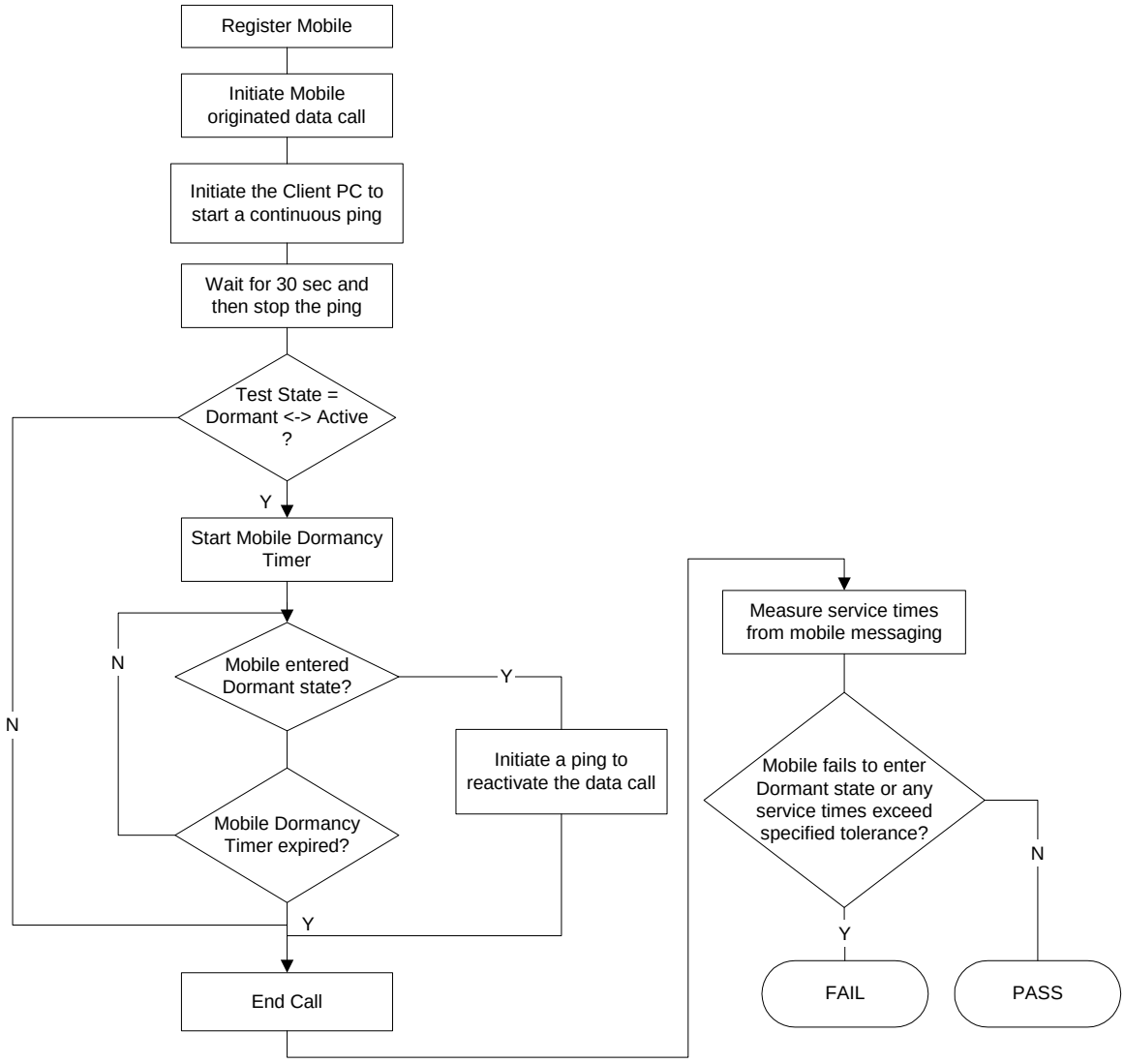
2.6.1.4 Test Results

The following test results are supported for this test:

- Service Setup Time (Sec)
- Channel Setup Time (Sec)
- Channel Teardown Time (Sec)
- Service Negotiation Time (Sec)
- Action Time/In-Out of Dormancy (Sec)

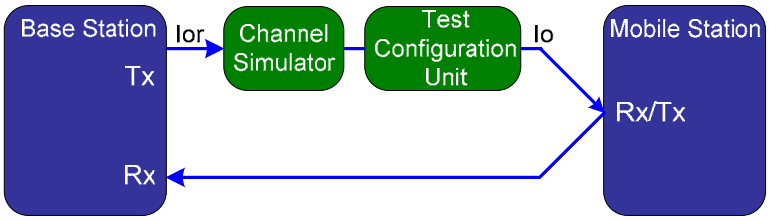
2.6.1.5 Test Algorithm

The following flowchart details the actions and measurements taken after the call is set up.



2.6.2. 1X File Transfer

2.6.2.1 Hardware Configuration



NOTE: The Channel Simulator is optional for this test.

2.6.2.2 Description

This test verifies that files can be transferred from one PC to another across the RF link at an expected throughput level. Files can be transferred either from the client to the server, from the server to the client, or both simultaneously. File transfers can be done using FTP, HTTP or UDP protocol, and can be done in a clean or impaired RF channel.

2.6.2.3 UDP Configuration

The UDP setting is available for 1X and EV-DO throughput tests. Under Test Parameters select **File Transfer Parameters›Transfer Protocol** and select the UDP option.

2.6.2.4 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Network Parameters	• IP Negotiation Type
Levels	• Ior (dBm/1.23MHz) • FCH Ec/Ior (dB) • SCH Ec/Ior (dB)
Multi-path	
• Fading State • Velocity (km/hr) • Path1 State • Path1 Loss (dB) • Path1 Delay (micro-seconds)	• Path6 Delay (micro-seconds) • Path7 State • Path7 Loss (dB) • Path7 Delay (micro-seconds) • Path8 State

Test Parameters	
• Path2 State • Path2 Loss (dB) • Path2 Delay (micro-seconds) • Path3 State • Path3 Loss (dB) • Path3 Delay (micro-seconds) • Path4 State • Path4 Loss (dB) • Path4 Delay (micro-seconds) • Path5 State • Path5 Loss (dB) • Path5 Delay (micro-seconds) • Path6 State • Path6 Loss (dB)	• Path8 Loss (dB) • Path8 Delay (micro-seconds) • Path9 State • Path9 Loss (dB) • Path9 Delay (micro-seconds) • Path10 State • Path10 Loss (dB) • Path10 Delay (micro-seconds) • Path11 State • Path11 Loss (dB) • Path11 Delay (micro-seconds) • Path12 State • Path12 Loss (dB) • Path12 Delay (micro-seconds)
AWGN Parameters	• AWGN State • Ior/Ioc (dB)
File Transfer Parameters	• Number of File Transfers • Transfer Protocol • Transfer Direction • Upload Filesize • Download Filesize • Bi-Directional Transfer Mode
AirAccess Data Parameters	• RLP Frame Type • Forward Data Rate Multiplier • Forward SCH Coding • Reverse Data Rate Multiplier • Reverse SCH Coding
Test Criteria	• Required Upload Throughput (Kbps) • Required Download Throughput (Kbps) • Transfer Check Criteria

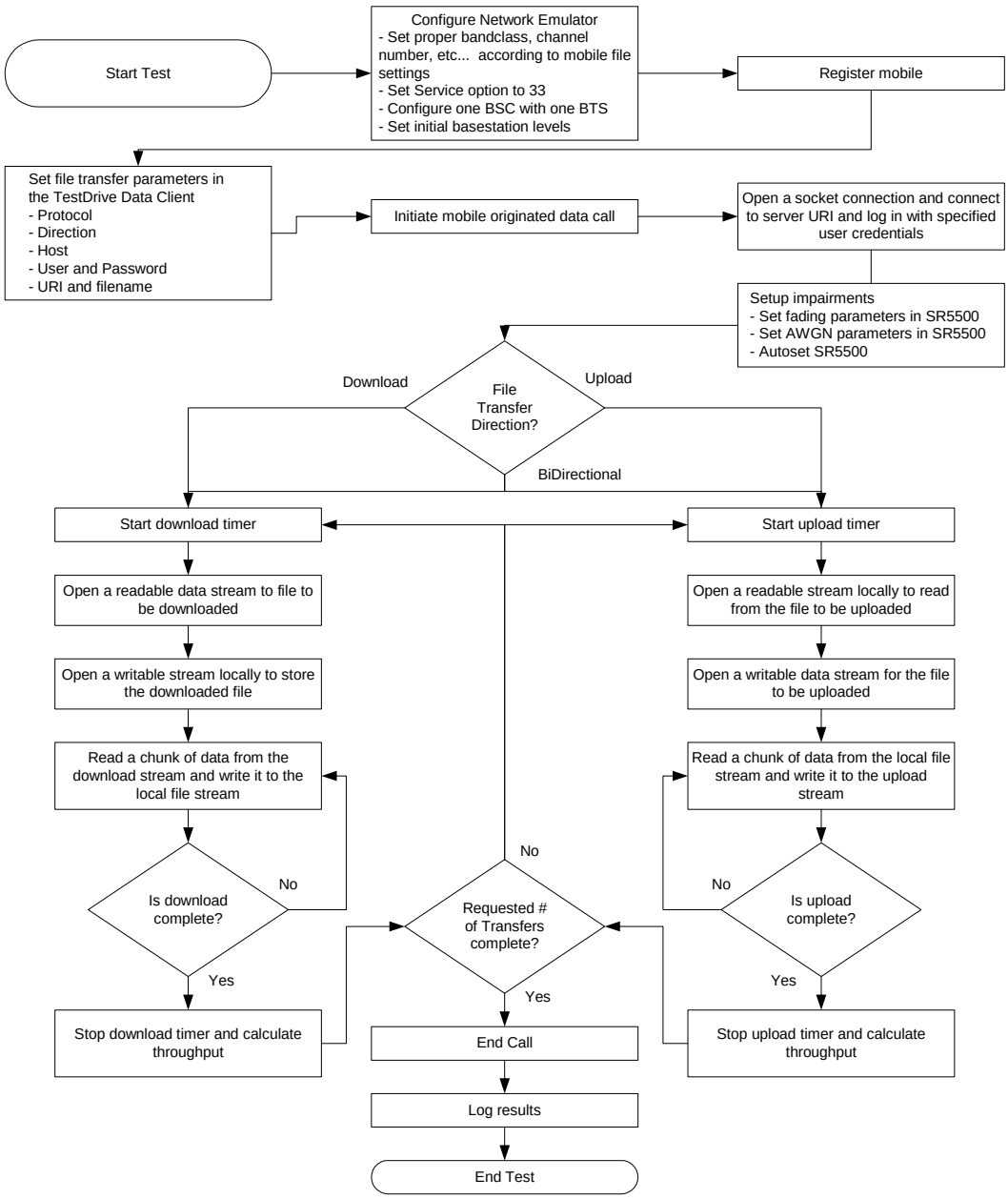
2.6.2.5 Test Results

The following test results are supported for this test:

- Forward Link Throughput (Kbps)
- Reverse Link Throughput (Kbps)

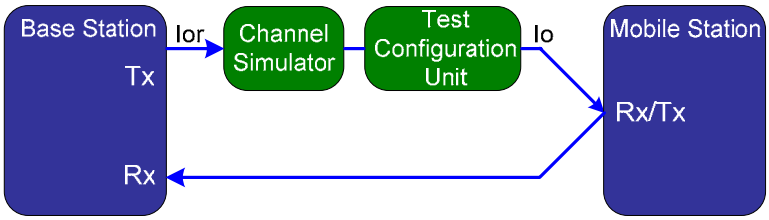
2.6.2.6 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.6.3. 1X Fixed Level Stress Test

2.6.3.1 Hardware Configuration



NOTE: The Channel Simulator is optional for this test.

2.6.3.2 Description

This test verifies that files can be transferred from one PC to another across the RF link, at an expected throughput level for an extended period of time, without experiencing a decrease in performance. Files can be transferred either from the client to the server, from the server to the client, or both simultaneously. File transfers can be done using FTP, HTTP or UDP protocol, and can be done in a clean or impaired RF channel.

2.6.3.3 UDP Configuration

The UDP setting is available for 1X and EV-DO throughput tests. Under Test Parameters, select File Transfer Parameters›Transfer Protocol›UDP Option.

2.6.3.4 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Network Parameters	• IP Negotiation Type
Levels	• Ior (dBm/1.23MHz) • FCH Ec/Ior (dB) • SCH Ec/Ior (dB)
Multi-path	
• Fading State • Velocity (km/hr) • Path1 State • Path1 Loss (dB) • Path1 Delay (micro-seconds) • Path2 State • Path2 Loss (dB) • Path2 Delay (micro-seconds) • Path3 State • Path3 Loss (dB) • Path3 Delay (micro-seconds) • Path4 State • Path4 Loss (dB) • Path4 Delay (micro-seconds) • Path5 State • Path5 Loss (dB) • Path5 Delay (micro-seconds) • Path6 State	• Path6 Delay (micro-seconds) • Path7 State • Path7 Loss (dB) • Path7 Delay (micro-seconds) • Path8 State • Path8 Loss (dB) • Path8 Delay (micro-seconds) • Path9 State • Path9 Loss (dB) • Path9 Delay (micro-seconds) • Path10 State • Path10 Loss (dB) • Path10 Delay (micro-seconds) • Path11 State • Path11 Loss (dB) • Path11 Delay (micro-seconds) • Path12 State • Path12 Loss (dB)
File Transfer Parameters	• Stress Duration (min) • Transfer Protocol • Transfer Direction • Upload Filesize • Download Filesize • Bi-Directional Transfer Mode
AirAccess Data Parameters	• RLP Frame Type • Forward Data Rate Multiplier • Forward SCH Coding • Reverse Data Rate Multiplier • Reverse SCH Coding

Test Parameters	
Test Criteria	• Required Upload Throughput (Kbps) • Required Download Throughput (Kbps) • Transfer Check Criteria

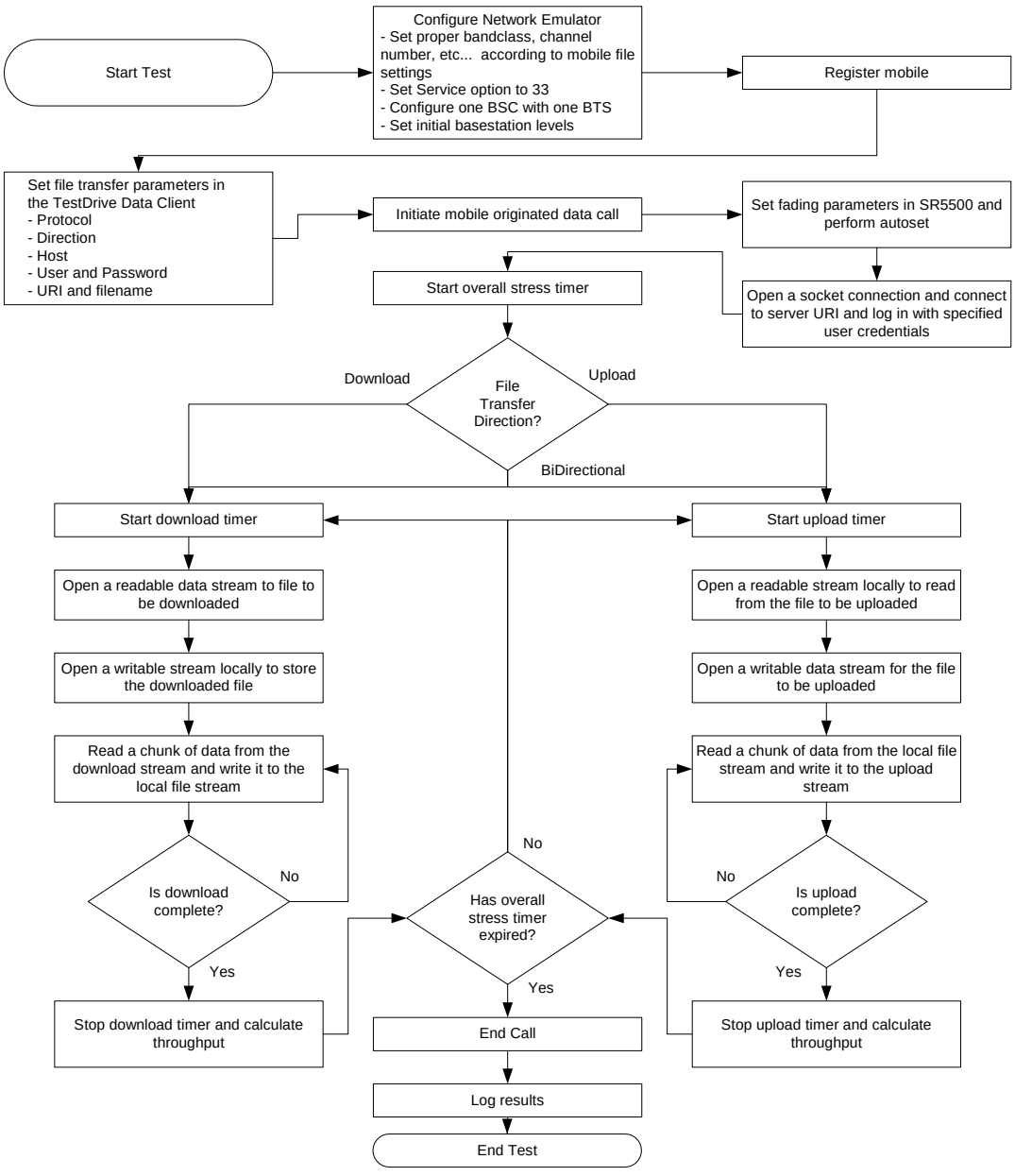
2.6.3.5 Test Results

The following test results are supported for this test.

- Total File Transfers
- File Transfers Failed
- Forward Link Throughput (Kbps)
- Reverse Link Throughput (Kbps)

2.6.3.6 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.6.4. Spirent Sample Test Suites – 1X Data Throughput

2.6.4.1 1X Test Cases

Test Suite #1

Channel Setup and Teardown Time		
Test #	Test Name	Test Description
1	Channel Setup and Teardown Time	Channel Setup and Teardown Time – Idle State
2	Channel Setup and Teardown Time	Channel Setup and Teardown Time – Dormant State

Test Suite #2

File Transfers in a Rayleigh Fading Environment with AWGN		
Test #	Test Name	Test Description
1	File Transfer	Reverse FTP Transfer @ 4X (100km/hr – 3 Path, Ior/Ioc = 8)
2	File Transfer	Forward FTP Transfer @ 4X (100km/hr – 3 Path, Ior/Ioc = 8)
3	File Transfer	Bi-Directional FTP Transfer @ 4X (100km/hr – 3 Path, Ior/Ioc = 8)
4	File Transfer	Reverse HTTP Transfer @ 4X (100km/hr – 3 Path, Ior/Ioc = 8)
5	File Transfer	Forward HTTP Transfer @ 4X (100km/hr – 3 Path, Ior/Ioc = 8)
6	File Transfer	Bi-Directional HTTP Transfer @ 4X (100km/hr – 3 Path, Ior/Ioc = 8)

Test Suite #3

File Transfers in a Rayleigh Fading Environment		
Test #	Test Name	Test Description
1	File Transfer	Reverse FTP Transfer @ 4X (100km/hr – 3 Path)
2	File Transfer	Forward FTP Transfer @ 4X (100km/hr – 3 Path)
3	File Transfer	Bi-Directional FTP Transfer @ 4X (100km/hr – 3 Path)
4	File Transfer	Reverse HTTP Transfer @ 4X (100km/hr – 3 Path)
5	File Transfer	Forward HTTP Transfer @ 4X (100km/hr – 3 Path)
6	File Transfer	Bi-Directional HTTP Transfer @ 4X (100km/hr – 3 Path)

Test Suite #4

File Transfers with Varied Ior\Ioc		
Test #	Test Name	Test Description
1	File Transfer	Reverse FTP Transfer @ 4X – Ior/Ioc = 10
2	File Transfer	Reverse FTP Transfer @ 4X – Ior/Ioc = 5
3	File Transfer	Reverse FTP Transfer @ 4X – Ior/Ioc = 0
4	File Transfer	Reverse FTP Transfer @ 4X – Ior/Ioc = -5
5	File Transfer	Forward FTP Transfer @ 4X – Ior/Ioc = 10
6	File Transfer	Forward FTP Transfer @ 4X – Ior/Ioc = 5
7	File Transfer	Forward FTP Transfer @ 4X – Ior/Ioc = 1
8	File Transfer	Bi-directional FTP Transfer @ 4X – Ior/Ioc = 10
9	File Transfer	Bi-directional FTP Transfer @ 4X – Ior/Ioc = 5
10	File Transfer	Bi-directional FTP Transfer @ 4X – Ior/Ioc = 1
11	File Transfer	Reverse HTTP Transfer @ 4X – Ior/Ioc = 10
12	File Transfer	Reverse HTTP Transfer @ 4X – Ior/Ioc = 5
13	File Transfer	Reverse HTTP Transfer @ 4X – Ior/Ioc = 0
14	File Transfer	Reverse HTTP Transfer @ 4X – Ior/Ioc = -5
15	File Transfer	Forward HTTP Transfer @ 4X – Ior/Ioc = 10
16	File Transfer	Forward HTTP Transfer @ 4X – Ior/Ioc = 5
17	File Transfer	Forward HTTP Transfer @ 4X – Ior/Ioc = 1
18	File Transfer	Bi-directional HTTP Transfer @ 4X – Ior/Ioc = 10
19	File Transfer	Bi-directional HTTP Transfer @ 4X – Ior/Ioc = 5
20	File Transfer	Bi-directional HTTP Transfer @ 4X – Ior/Ioc = 1

Test Suite #5

File Transfers with Varied RLP Frame Type		
Test #	Test Name	Test Description
1	File Transfer	Reverse FTP Transfer @ 16X – Segemented Frames
2	File Transfer	Reverse FTP Transfer @ 16X – Unsegmented Frames – No Format B
3	File Transfer	Reverse FTP Transfer @ 16X – Unsegmented Frames – Format B
4	File Transfer	Forward FTP Transfer @ 16X – Segemented Frames
5	File Transfer	Forward FTP Transfer @ 16X – Unsegmented Frames – No Format B
6	File Transfer	Forward FTP Transfer @ 16X – Unsegmented Frames – Format B
7	File Transfer	Bi-Directional FTP Transfer @ 16X – Segemented Frames
8	File Transfer	Bi-Directional FTP Transfer @ 16X – Unsegmented Frames – No Format B
9	File Transfer	Bi-Directional FTP Transfer @ 16X – Unsegmented Frames – Format B
10	File Transfer	Reverse HTTP Transfer @ 16X – Segemented Frames
11	File Transfer	Reverse HTTP Transfer @ 16X – Unsegmented Frames – No Format B

File Transfers with Varied RLP Frame Type		
12	File Transfer	Reverse HTTP Transfer @ 16X – Unsegmented Frames – Format B
13	File Transfer	Forward HTTP Transfer @ 16X – Segemented Frames
14	File Transfer	Forward HTTP Transfer @ 16X – Unsegmented Frames – No Format B
15	File Transfer	Forward HTTP Transfer @ 16X – Unsegmented Frames – Format B
16	File Transfer	Bi-Directional HTTP Transfer @ 16X – Segemented Frames
17	File Transfer	Bi-Directional HTTP Transfer @ 16X – Unsegmented Frames – No Format B
18	File Transfer	Bi-Directional HTTP Transfer @ 16X – Unsegmented Frames – Format B

Test Suite #6

File Transfers with Varied Supplemental Channel MUX Option		
Test #	Test Name	Test Description
1	File Transfer	Reverse FTP Transfer – No Supplemental Channel
2	File Transfer	Reverse FTP Transfer – 1X (MUX 0x03)
3	File Transfer	Reverse FTP Transfer – 2X (MUX 0x809)
4	File Transfer	Reverse FTP Transfer – 2X (MUX 0x905)
5	File Transfer	Reverse FTP Transfer – 4X (MUX 0x811)
6	File Transfer	Reverse FTP Transfer – 4X (MUX 0x909)
7	File Transfer	Reverse FTP Transfer – 8X (MUX 0x821)
8	File Transfer	Reverse FTP Transfer – 8X (MUX 0x911)
9	File Transfer	Reverse FTP Transfer – 16X (MUX 0x921)
10	File Transfer	Forward FTP Transfer – No Supplemental Channel
11	File Transfer	Forward FTP Transfer – 1X (MUX 0x03)
12	File Transfer	Forward FTP Transfer – 2X (MUX 0x809)
13	File Transfer	Forward FTP Transfer – 2X (MUX 0x905)
14	File Transfer	Forward FTP Transfer – 4X (MUX 0x811)
15	File Transfer	Forward FTP Transfer – 4X (MUX 0x909)
16	File Transfer	Forward FTP Transfer – 8X (MUX 0x821)
17	File Transfer	Forward FTP Transfer – 8X (MUX 0x911)
18	File Transfer	Forward FTP Transfer – 16X (MUX 0x921)
19	File Transfer	Bi-Directional FTP Transfer – No Supplemental Channel
20	File Transfer	Bi-Directional FTP Transfer – 1X (MUX 0x03)
21	File Transfer	Bi-Directional FTP Transfer – 2X (MUX 0x809)
22	File Transfer	Bi-Directional FTP Transfer – 2X (MUX 0x905)
23	File Transfer	Bi-Directional FTP Transfer – 4X (MUX 0x811)
24	File Transfer	Bi-Directional FTP Transfer – 4X (MUX 0x909)
25	File Transfer	Bi-Directional FTP Transfer – 8X (MUX 0x821)
26	File Transfer	Bi-Directional FTP Transfer – 8X (MUX 0x911)
27	File Transfer	Bi-Directional FTP Transfer – 16X (MUX 0x921)

File Transfers with Varied Supplemental Channel MUX Option		
28	File Transfer	Reverse HTTP Transfer – No Supplemental Channel
29	File Transfer	Reverse HTTP Transfer – 1X (MUX 0x03)
30	File Transfer	Reverse HTTP Transfer – 2X (MUX 0x809)
31	File Transfer	Reverse HTTP Transfer – 2X (MUX 0x905)
32	File Transfer	Reverse HTTP Transfer – 4X (MUX 0x811)
33	File Transfer	Reverse HTTP Transfer – 4X (MUX 0x909)
34	File Transfer	Reverse HTTP Transfer – 8X (MUX 0x821)
35	File Transfer	Reverse HTTP Transfer – 8X (MUX 0x911)
36	File Transfer	Reverse HTTP Transfer – 16X (MUX 0x921)
37	File Transfer	Forward HTTP Transfer – No Supplemental Channel
38	File Transfer	Forward HTTP Transfer – 1X (MUX 0x03)
39	File Transfer	Forward HTTP Transfer – 2X (MUX 0x809)
40	File Transfer	Forward HTTP Transfer – 2X (MUX 0x905)
41	File Transfer	Forward HTTP Transfer – 4X (MUX 0x811)
42	File Transfer	Forward HTTP Transfer – 4X (MUX 0x909)
43	File Transfer	Forward HTTP Transfer – 8X (MUX 0x821)
44	File Transfer	Forward HTTP Transfer – 8X (MUX 0x911)
45	File Transfer	Forward HTTP Transfer – 16X (MUX 0x921)
46	File Transfer	Bi-Directional HTTP Transfer – No Supplemental Channel
47	File Transfer	Bi-Directional HTTP Transfer – 1X (MUX 0x03)
48	File Transfer	Bi-Directional HTTP Transfer – 2X (MUX 0x809)
49	File Transfer	Bi-Directional HTTP Transfer – 2X (MUX 0x905)
50	File Transfer	Bi-Directional HTTP Transfer – 4X (MUX 0x811)
51	File Transfer	Bi-Directional HTTP Transfer – 4X (MUX 0x909)
52	File Transfer	Bi-Directional HTTP Transfer – 8X (MUX 0x821)
53	File Transfer	Bi-Directional HTTP Transfer – 8X (MUX 0x911)
54	File Transfer	Bi-Directional HTTP Transfer – 16X (MUX 0x921)

Test Suite #7

Fixed Level FTP Stress Tests		
Test #	**Test Name**	**Test Description**
1	Fixed Level Stress Test	Reverse FTP Stress Test @ 16X, 1 hour
2	Fixed Level Stress Test	Forward FTP Stress Test @ 16X, 1 hour
3	Fixed Level Stress Test	Bi-Directional FTP Stress Test @ 16X, 1 hour

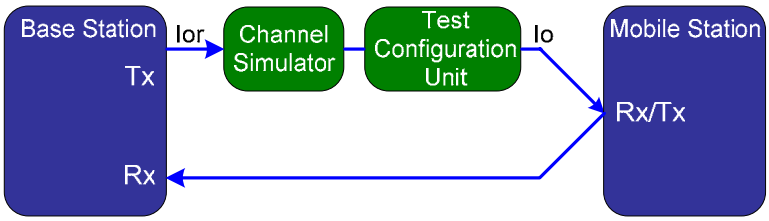
Test Suite #8

Fixed Level HTTP Stress Tests		
Test #	**Test Name**	**Test Description**
1	Fixed Level Stress Test	Reverse HTTP Stress Test @ 16X, 1 hour
2	Fixed Level Stress Test	Forward HTTP Stress Test @ 16X, 1 hour
3	Fixed Level Stress Test	Bi-Directional HTTP Stress Test @ 16X, 1 hour

2.7. EV-DO Data Throughput Test Cases

2.7.1. EV-DO File Transfer

2.7.1.1 Hardware Configuration



NOTE: The Channel Simulator is optional for this test.

2.7.1.2 Description

This test verifies that files can be transferred from one PC to another across the RF link at an expected throughput level. Files can be transferred either from the client to the server, from the server to the client, or both simultaneously. File transfers can be done using FTP, HTTP or UDP protocol, and can be done in a clean or impaired RF channel.

2.7.1.3 UDP Configuration

The UDP setting is available for 1X and EV-DO throughput tests. Under Test Parameters select **File Transfer Parameters›Transfer Protocol** and select the UDP option.

2.7.1.4 RF Diversity Configuration

An SR5078 TCU (Test Configuration Unit) is required to run RF Diversity tests. This option is disabled by default. To enable Diversity, select the option under **Test Parameters›Network Parameters›Use Diversity Configuration** option. Select **Enabled** from the menu. Calibration of the system is also required.

2.7.1.5 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel • Applies to Slot Cycle Index
Network Parameters	• IP Negotiation Type • EV-DO Revision • EV-DO Packet Type Configuration • Use Diversity Configuration
Levels	• Ior (dBm/1.23MHz)
Multi-path	
• Fading State • Velocity (km/hr) • Path1 State • Path1 Loss (dB) • Path1 Delay (micro-seconds) • Path2 State • Path2 Loss (dB) • Path2 Delay (micro-seconds) • Path3 State • Path3 Loss (dB) • Path3 Delay (micro-seconds) • Path4 State • Path4 Loss (dB) • Path4 Delay (micro-seconds) • Path5 State • Path5 Loss (dB) • Path5 Delay (micro-seconds) • Path6 State • Path6 Loss (dB)	• Path6 Delay (micro-seconds) • Path7 State • Path7 Loss (dB) • Path7 Delay (micro-seconds) • Path8 State • Path8 Loss (dB) • Path8 Delay (micro-seconds) • Path9 State • Path9 Loss (dB) • Path9 Delay (micro-seconds) • Path10 State • Path10 Loss (dB) • Path10 Delay (micro-seconds) • Path11 State • Path11 Loss (dB) • Path11 Delay (micro-seconds) • Path12 State • Path12 Loss (dB) • Path12 Delay (micro-seconds)
AWGN Parameters	• AWGN State • Ior/Ioc (dB)
File Transfer Parameters	• Number of File Transfers • Transfer Protocol • Transfer Direction • Upload Filesize • Download Filesize • Bi-Directional Transfer Mode

Test Parameters	
Test Criteria	• Required Upload Throughput (Kbps) • Required Upload Throughput (Kbps) • Transfer Check Criteria

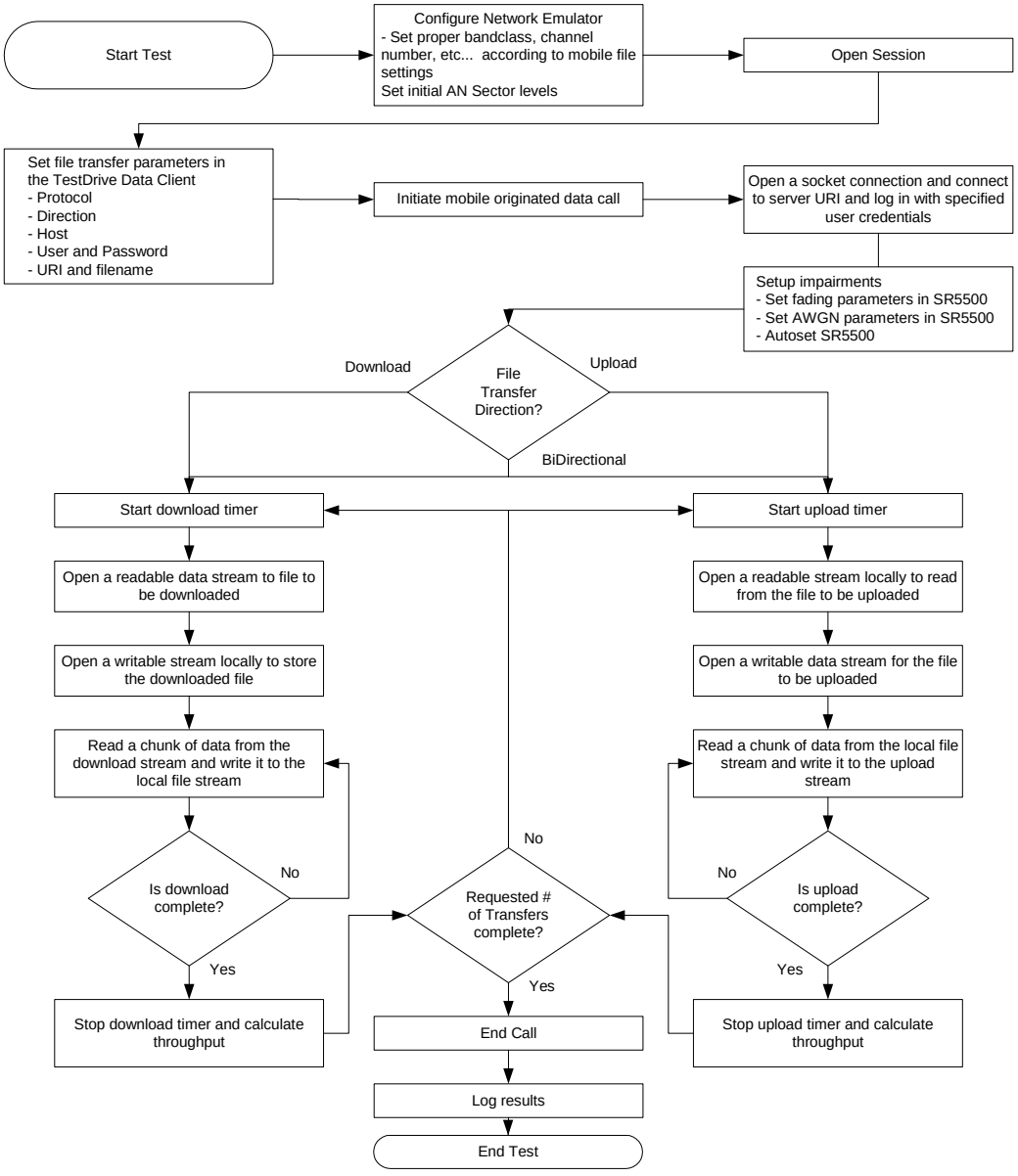
2.7.1.6 Test Results

The following test results are supported for this test:

- Forward Link Throughput (Kbps)
- Reverse Link Throughput (Kbps)

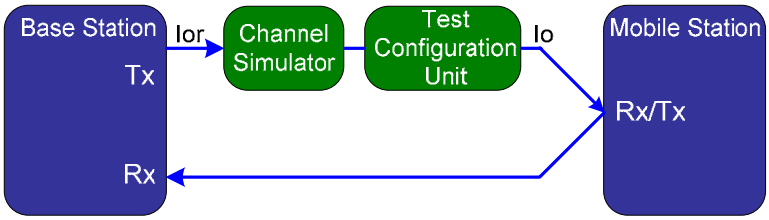
2.7.1.7 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.7.2. EV-DO Fixed Level Stress

2.7.2.1 Hardware Configuration



NOTE: The Channel Simulator is optional for this test.

2.7.2.2 Description

This test verifies that files can be transferred from one PC to another across the RF link at an expected throughput level for an extended period of time without experiencing a decrease in performance. Files can be transferred either from the client to the server, from the server to the client, or both simultaneously. File transfers can be done using FTP, HTTP, or UDP protocol, and can be done in a clean or impaired RF channel.

2.7.2.3 UDP Configuration

The UDP setting is available for 1X and EV-DO throughput tests. Under Test Parameters select **File Transfer Parameters›Transfer Protocol** and select the UDP option.

2.7.2.4 RF Diversity Configuration

An SR5078 TCU (Test Configuration Unit) is required to run RF Diversity tests. This option is disabled by default. To enable diversity select the option under **Test Parameters›Network Parameters›Use Diversity Configuration** option. Select Enabled from the menu. Calibration of the system will also be required.

2.7.2.5 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel • Applies to Slot Cycle Index
Network Parameters	• IP Negotiation Type • EV-DO Revision • EV-DO Packet Type Configuration • Use Diversity Configuration
Levels	• Ior (dBm/1.23MHz)
Multi-path	
• Fading State • Velocity (km/hr) • Path1 State • Path1 Loss (dB) • Path1 Delay (micro-seconds) • Path2 State • Path2 Loss (dB) • Path2 Delay (micro-seconds) • Path3 State • Path3 Loss (dB) • Path3 Delay (micro-seconds) • Path4 State • Path4 Loss (dB) • Path4 Delay (micro-seconds) • Path5 State • Path5 Loss (dB) • Path5 Delay (micro-seconds) • Path6 State • Path6 Loss (dB)	• Path6 Delay (micro-seconds) • Path7 State • Path7 Loss (dB) • Path7 Delay (micro-seconds) • Path8 State • Path8 Loss (dB) • Path8 Delay (micro-seconds) • Path9 State • Path9 Loss (dB) • Path9 Delay (micro-seconds) • Path10 State • Path10 Loss (dB) • Path10 Delay (micro-seconds) • Path11 State • Path11 Loss (dB) • Path11 Delay (micro-seconds) • Path12 State • Path12 Loss (dB) • Path12 Delay (micro-seconds)
AWGN Parameters	• AWGN State • Ior/Ior (dB)
File Transfer Parameters	• Stress Duration (min) • Transfer Protocol • Transfer Direction • Upload Filesize • Download Filesize • Bi-Directional Transfer Mode

Test Parameters	
Test Criteria	• Required Upload Throughput (Kbps) • Required Download Throughput (Kbps) • Transfer Check Criteria

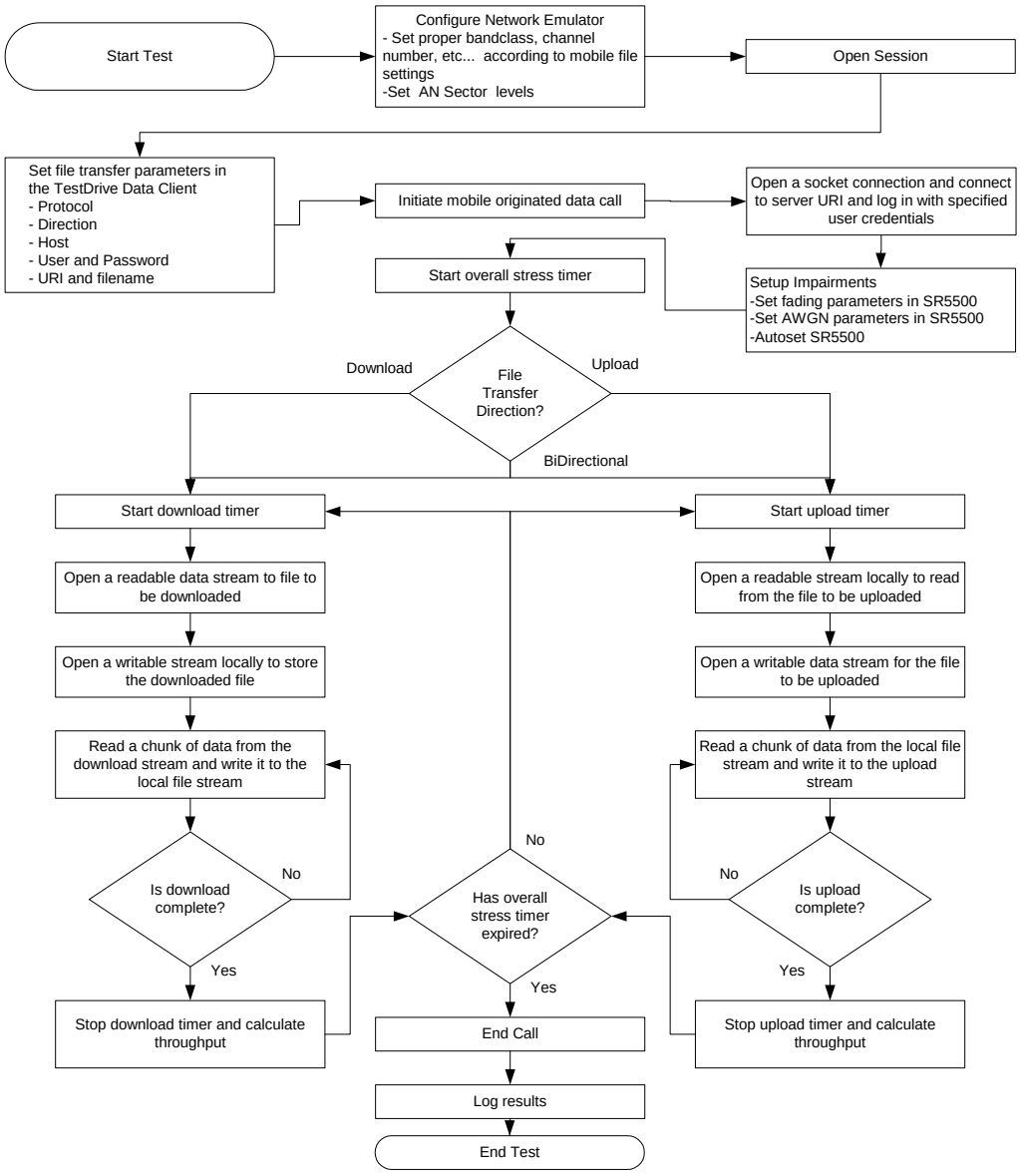
2.7.2.6 Test Results

The following test results are supported for this test:

- Total File Transfers
- File Transfers Failed
- Forward Link Throughput (Kbps)
- Reverse Link Throughput (Kbps)

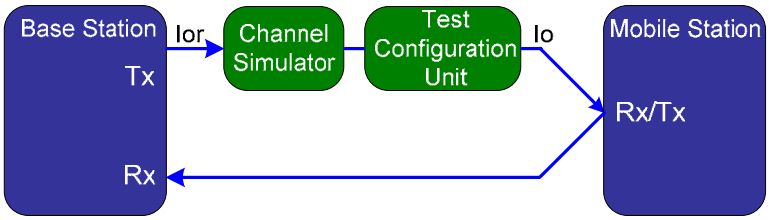
2.7.2.7 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.7.3. EV-DO Data Ping Round-Trip Delay

2.7.3.1 Hardware Configuration



NOTE: The Channel Simulator is optional for this test.

2.7.3.2 Description

This test verifies that files can be transferred from one PC to another across the RF link at an expected throughput level for an extended period of time without experiencing a decrease in performance. Files can be transferred either from the client to the server, from the server to the client, or both simultaneously. File transfers can be done using FTP, HTTP, or UDP protocol, and can be done in a clean or impaired RF channel.

2.7.3.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Network Parameters	• IP Negotiation Type • EV-DO Revision • EV-DO Packet Type Configuration
Levels	• Ior (dBm/1.23MHz)
Multi-path	
• Fading State • Velocity (km/hr) • Path1 State • Path1 Loss (dB) • Path1 Delay (micro-seconds) • Path2 State • Path2 Loss (dB) • Path2 Delay (micro-seconds) • Path3 State	• Path6 Delay (micro-seconds) • Path7 State • Path7 Loss (dB) • Path7 Delay (micro-seconds) • Path8 State • Path8 Loss (dB) • Path8 Delay (micro-seconds) • Path9 State • Path9 Loss (dB)

Test Parameters	
• Path3 Loss (dB) • Path3 Delay (micro-seconds) • Path4 State • Path4 Loss (dB) • Path4 Delay (micro-seconds) • Path5 State • Path5 Loss (dB) • Path5 Delay (micro-seconds) • Path6 State • Path6 Loss (dB)	• Path9 Delay (micro-seconds) • Path10 State • Path10 Loss (dB) • Path10 Delay (micro-seconds) • Path11 State • Path11 Loss (dB) • Path11 Delay (micro-seconds) • Path12 State • Path12 Loss (dB) • Path12 Delay (micro-seconds)
AWGN Parameters	• AWGN State • Ior/Ioc (dB)
Data Ping Parameters	• Ping Duration (sec)
Test Criteria	• Packets Lost (%) • Minimum Round-Trip Delay (ms) • Maximum Round-Trip Delay (ms) • Average Round-Trip Delay (ms)

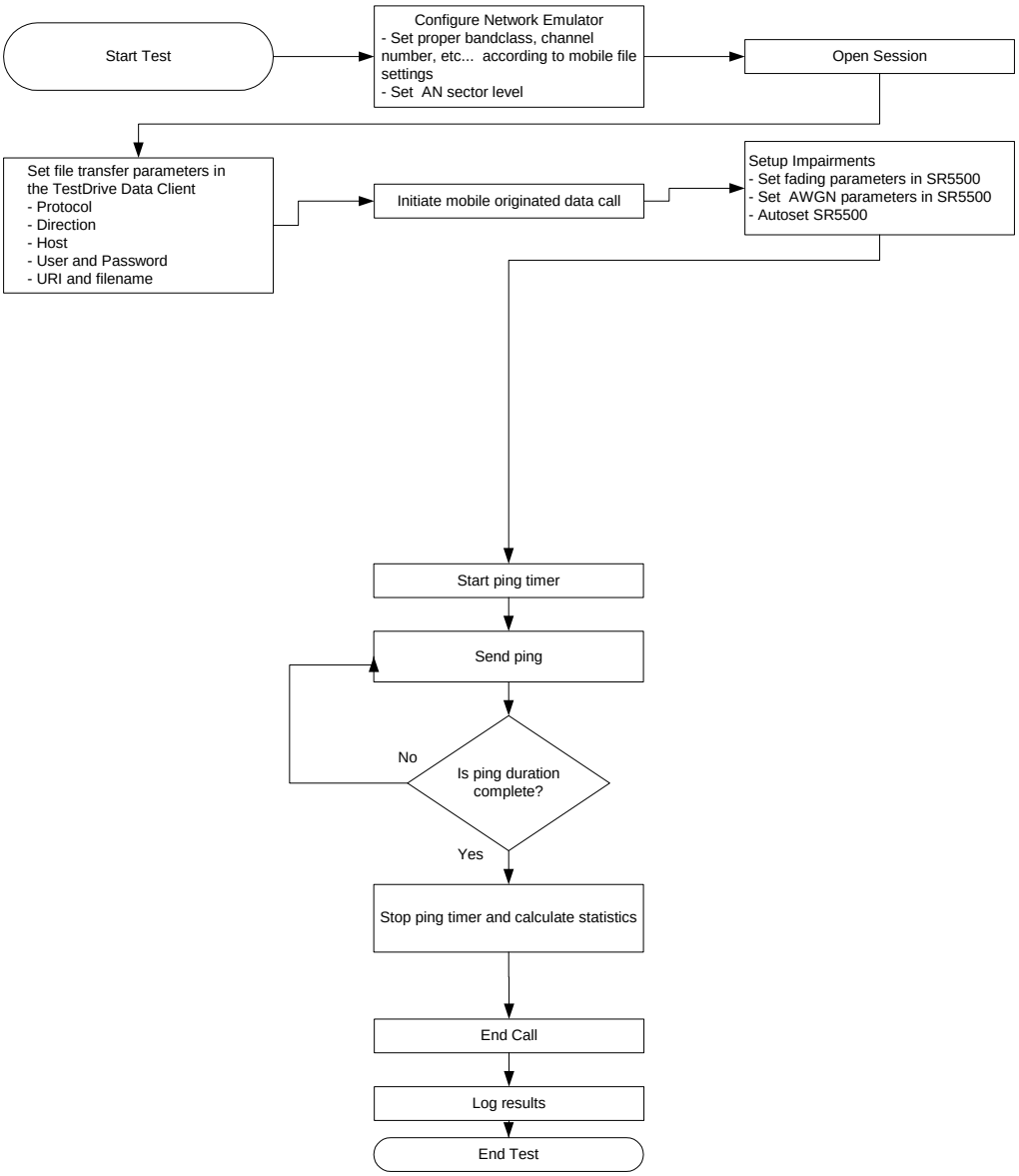
2.7.3.4 Test Results

The following test results are supported for this test:

- Packets Sent
- Packets Received
- Packets Lost (%)
- Minimum Round-Trip Delay (ms)
- Maximum Round-Trip Delay (ms)
- Average Round-Trip Delay (ms)

2.7.3.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.7.4. Spirent Sample Test Suites – EV-DO Data Throughput

2.7.4.1 EV-DO Rev0 Test Cases

Test Suite #1

EV-DO Channel Setup and Teardown Time		
Test #	Test Name	Test Description
1	EV-DO Channel Setup and Teardown Time	EV-DO Channel Setup and Teardown Time – Idle State
2	EV-DO Channel Setup and Teardown Time	EV-DO Channel Setup and Teardown Time – Idle State

Test Suite #2

EV-DO Data Ping Round-Trip Delay		
Test #	Test Name	Test Description
1	EV-DO Data Ping	EV-DO Data Ping-Round Trip Delay
2	EV-DO Data Ping	EV-DO Data Ping-Round Trip Delay (Ior/Ior = 8)

Test Suite #3

EV-DO File Transfers in a Rayleigh Fading Environment with AWGN		
Test #	Test Name	Test Description
1	EV-DO File Transfer	Reverse FTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)
2	EV-DO File Transfer	Forward FTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)
3	EV-DO File Transfer	Bi-Directional FTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)
4	EV-DO File Transfer	Reverse HTTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)
5	EV-DO File Transfer	Forward HTTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)
6	EV-DO File Transfer	Bi-Directional HTTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)

Test Suite #4

EV-DO File Transfers in a Rayleigh Fading Environment		
Test #	**Test Name**	**Test Description**
1	EV-DO File Transfer	Reverse FTP Transfer (100km/hr -3 path, SCI = 1)
2	EV-DO File Transfer	Forward FTP Transfer (100km/hr -3 path, SCI = 1)
3	EV-DO File Transfer	Bi-Directional FTP Transfer (100km/hr -3 path, SCI = 1)
4	EV-DO File Transfer	Reverse HTTP Transfer (100km/hr -3 path, SCI = 1)
5	EV-DO File Transfer	Forward HTTP Transfer (100km/hr -3 path, SCI = 1)
6	EV-DO File Transfer	Bi-Directional HTTP Transfer (100km/hr -3 path, SCI = 1)

Test Suite #5

EV-DO File Transfers with Varied Ior\Ioc		
Test #	**Test Name**	**Test Description**
1	EV-DO File Transfer	Reverse FTP Transfer – Ior/Ioc = 10, SCI = 1
2	EV-DO File Transfer	Reverse FTP Transfer – Ior/Ioc = 5, SCI = 1
3	EV-DO File Transfer	Forward FTP Transfer – Ior/Ioc = 10, SCI = 1
4	EV-DO File Transfer	Forward FTP Transfer – Ior/Ioc = 5, SCI = 1
5	EV-DO File Transfer	Bi-Directional FTP Transfer – Ior/Ioc = 10, SCI = 1
6	EV-DO File Transfer	Bi-Directional FTP Transfer – Ior/Ioc = 5, SCI = 1
7	EV-DO File Transfer	Reverse HTTP Transfer – Ior/Ioc = 10, SCI = 1
8	EV-DO File Transfer	Reverse HTTP Transfer – Ior/Ioc = 5, SCI = 1
9	EV-DO File Transfer	Forward HTTP Transfer – Ior/Ioc = 10, SCI = 1
10	EV-DO File Transfer	Forward HTTP Transfer – Ior/Ioc = 5, SCI = 1
11	EV-DO File Transfer	Bi-Directional HTTP Transfer – Ior/Ioc = 10, SCI = 1
12	EV-DO File Transfer	Bi-Directional HTTP Transfer – Ior/Ioc = 5, SCI = 1

Test Suite #6

EV-DO Fixed Level FTP Stress Tests		
Test #	**Test Name**	**Test Description**
1	EV-DO Stress Test	Reverse FTP Stress Test, 1 hour, SCI = 1
2	EV-DO Stress Test	Forward FTP Stress Test, 1 hour, SCI = 1
3	EV-DO Stress Test	Bi-Directional FTP Stress Test, 1 hour, SCI = 1

Test Suite #7

EV-DO Fixed Level HTTP Stress Tests		
Test #	Test Name	Test Description
1	EV-DO Stress Test	Reverse HTTP Stress Test, 1 hour, SCI = 1
2	EV-DO Stress Test	Forward HTTP Stress Test, 1 hour, SCI = 1
3	EV-DO Stress Test	Bi-Directional HTTP Stress Test, 1 hour, SCI = 1

2.7.4.2 EV-DO RevA Test Cases

Test Suite #1

EV-DOrA Channel Setup and Teardown Time		
Test #	Test Name	Test Description
1	EV-DO Channel Setup and Teardown Time	EV-DO Channel Setup and Teardown Time – Idle State
2	EV-DO Channel Setup and Teardown Time	EV-DO Channel Setup and Teardown Time – Idle State

Test Suite #2

EV-DOrA Data Ping Round-Trip Delay		
Test #	Test Name	Test Description
1	EV-DO Data Ping	EV-DO Data Ping-Round Trip Delay
2	EV-DO Data Ping	EV-DO Data Ping-Round Trip Delay (Ior/Ior = 8)

Test Suite #3

EV-DOrA File Transfers in a Rayleigh Fading Environment with AWGN		
Test #	Test Name	Test Description
1	EV-DO File Transfer	Reverse FTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)
2	EV-DO File Transfer	Forward FTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)
3	EV-DO File Transfer	Bi-Directional FTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)
4	EV-DO File Transfer	Reverse HTTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)
5	EV-DO File Transfer	Forward HTTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)
6	EV-DO File Transfer	Bi-Directional HTTP Transfer (100km/hr -3 path, Ior/Ioc = 8, SCI = 1)

Test Suite #4

EV-DOrA File Transfers in a Rayleigh Fading Environment		
Test #	Test Name	Test Description
1	EV-DO File Transfer	Reverse FTP Transfer (100km/hr -3 path, SCI = 1)
2	EV-DO File Transfer	Forward FTP Transfer (100km/hr -3 path, SCI = 1)
3	EV-DO File Transfer	Bi-Directional FTP Transfer (100km/hr -3 path, SCI = 1)
4	EV-DO File Transfer	Reverse HTTP Transfer (100km/hr -3 path, SCI = 1)
5	EV-DO File Transfer	Forward HTTP Transfer (100km/hr -3 path, SCI = 1)
6	EV-DO File Transfer	Bi-Directional HTTP Transfer (100km/hr -3 path, SCI = 1)

Test Suite #5

EV-DOrA File Transfers with Varied Ior\Ioc		
Test #	Test Name	Test Description
1	EV-DO File Transfer	Reverse FTP Transfer – Ior/Ioc = 10, SCI = 1
2	EV-DO File Transfer	Reverse FTP Transfer – Ior/Ioc = 5, SCI = 1
3	EV-DO File Transfer	Forward FTP Transfer – Ior/Ioc = 10, SCI = 1
4	EV-DO File Transfer	Forward FTP Transfer – Ior/Ioc = 5, SCI = 1
5	EV-DO File Transfer	Bi-Directional FTP Transfer – Ior/Ioc = 10, SCI = 1
6	EV-DO File Transfer	Bi-Directional FTP Transfer – Ior/Ioc = 5, SCI = 1
7	EV-DO File Transfer	Reverse HTTP Transfer – Ior/Ioc = 10, SCI = 1
8	EV-DO File Transfer	Reverse HTTP Transfer – Ior/Ioc = 5, SCI = 1
9	EV-DO File Transfer	Forward HTTP Transfer – Ior/Ioc = 10, SCI = 1
10	EV-DO File Transfer	Forward HTTP Transfer – Ior/Ioc = 5, SCI = 1
11	EV-DO File Transfer	Bi-Directional HTTP Transfer – Ior/Ioc = 10, SCI = 1
12	EV-DO File Transfer	Bi-Directional HTTP Transfer – Ior/Ioc = 5, SCI = 1

Test Suite #6

EV-DOrA Fixed Level FTP Stress Tests		
Test #	Test Name	Test Description
1	EV-DO Stress Test	Reverse FTP Stress Test, 1 hour, SCI = 1
2	EV-DO Stress Test	Forward FTP Stress Test, 1 hour, SCI = 1
3	EV-DO Stress Test	Bi-Directional FTP Stress Test, 1 hour, SCI = 1

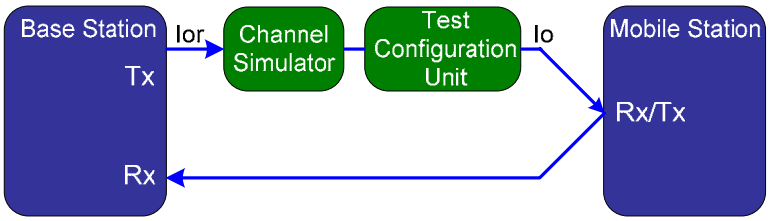
Test Suite #7

EV-DOrA Fixed Level HTTP Stress Tests		
Test #	Test Name	Test Description
1	EV-DO Stress Test	Reverse HTTP Stress Test, 1 hour, SCI = 1
2	EV-DO Stress Test	Forward HTTP Stress Test, 1 hour, SCI = 1
3	EV-DO Stress Test	Bi-Directional HTTP Stress Test, 1 hour, SCI = 1

2.8. 1X TIA-918 (C.S0037) Test Cases

2.8.1. 1X Simple IP Establishment and file transfer

2.8.1.1 Hardware Configuration



2.8.1.2 Description

There are several different test conditions for Simple IP Establishment and file transfer tests:

- 3.1 Simple IP Establishment without Authentication of the Mobile Station – If the mobile station can be configured to not use CHAP or PAP authentication, this test verifies that the mobile station and PDSN can successfully negotiate a PPP session during a Simple IP session. This test verifies the mobile station can successfully terminate the PPP session.
- 3.2 Simple IP Establishment with CHAP – This test verifies the proper operation of Simple IP with CHAP authentication. This test verifies the mobile station can terminate the PPP session.

2.8.1.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Application Parameters	• Application Type
Network Parameters	• IP Negotiation Type • Um PPP Authentication • CHAP or PAP Preferred • HA AAA Shared Secret Mismatch
Pass/Fail Criteria	• Verify MIP NAI in RRQ • Perform FTP • Check for CDMA Release Order

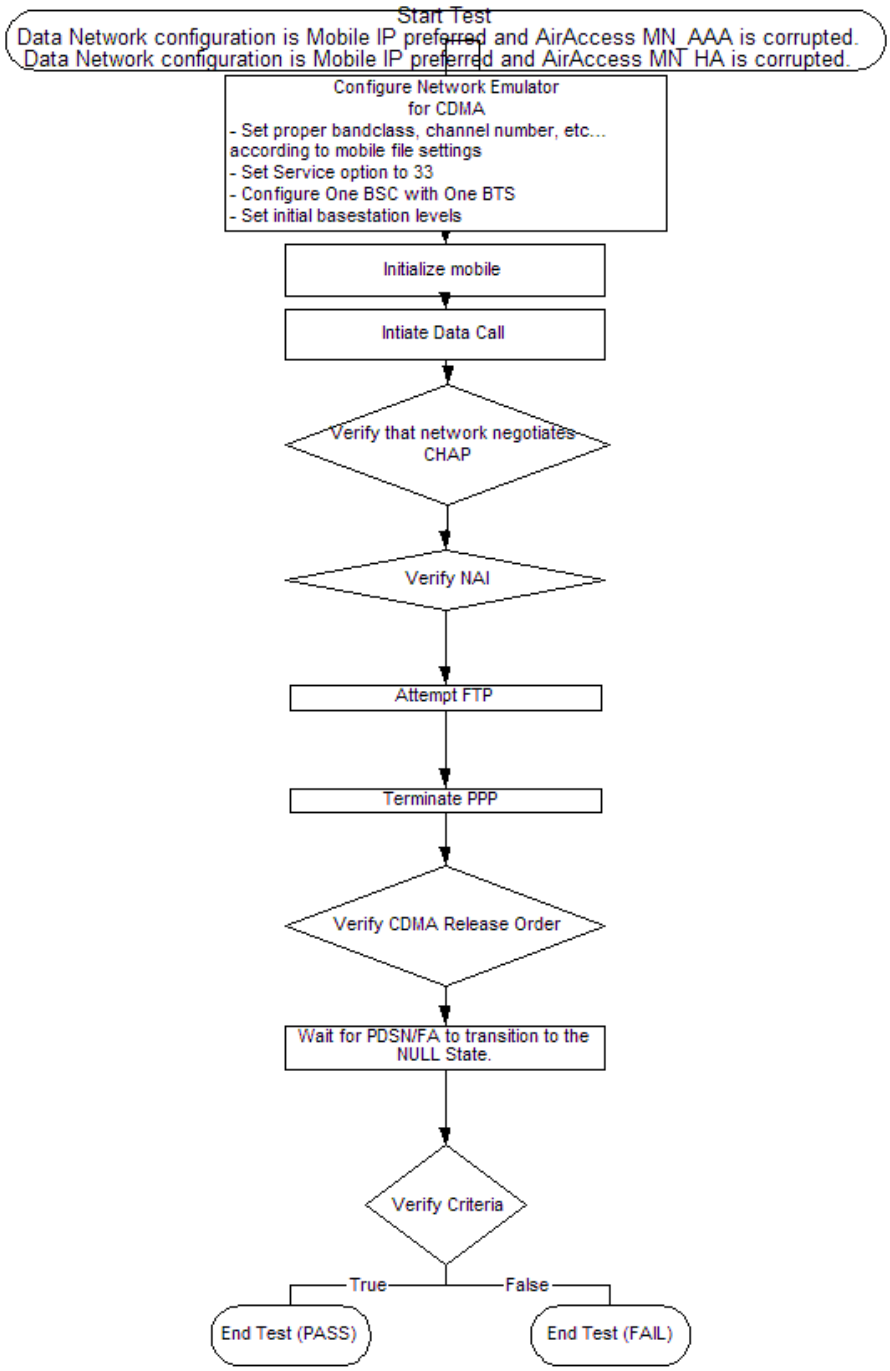
2.8.1.4 Test Results

The following test results are supported for this test:

- Verify MIP to SIP Fallback
- Verify CHAP Negotiated
- Verify NAI Valid
- Verify FTP Status
- Verify LCP Termination Request
- Verify CDMA Release Order
- Verify PDSN NULL State

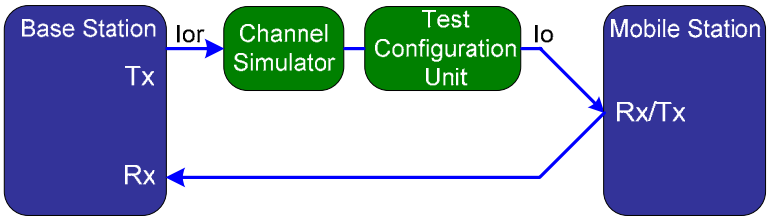
2.8.1.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.8.2. 1X MoIP Call Setup

2.8.2.1 Hardware Configuration



NOTE: The Channel Simulator is not used in this test.

2.8.2.2 Test Description

There are several different test conditions for MoIP Call Setup tests:

- 4.1 Successful PPP Negotiation and Termination – This test verifies that the mobile station and PDSN/FA can successfully negotiate a PPP session when initiating a Mobile IP call. This test verifies the mobile station will not include an IP–Address Configuration Option in the IPCP Configure–Request and PDSN shall not assign an IP address to the mobile station in IPCP. This test also verifies the mobile station can successfully terminate the PPP session.
- 4.2 Agent Discovery and Registration using Dynamic Home Address Assignment – This test verifies that the PDSN/FA sends Agent Advertisements upon the establishment of a PPP Session and the mobile station processes the Agent Advertisement correctly. The Mobile IP Registration Request (RRQ) and Mobile IP Registration Reply (RRP) process is verified.
- 4.3 Agent Discovery and Registration using Static Home Address Assignment – This test verifies that the PDSN/FA sends Agent Advertisements upon the establishment of a PPP Session and the mobile station processes the Agent Advertisement correctly. This test also verifies the Mobile IP Registration Request (RRQ) and Mobile IP Registration Reply (RRP) are processed correctly.
- 4.9 Mobile Station De-Registers – If the mobile stations supports de-registration, perform this test to verify the mobile station is able to de-register by setting the registration lifetime to 0 in the Mobile IP RRQ.
- 6.6 Private Network Support, Successful Scenario – This test verifies mobile station and PDSN/FA support private home addresses.

2.8.2.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Application Parameters	• Application Type
Network Parameters	• IP Negotiation Type • IP Address Assignment Type • Configure Dynamic Mobile Home IP Address Pool
Test Criteria	• Verify Agent Advertisements • Verify Agent Advertisement Challenge Extensions • Verify Mobile Registration Request • Verify MIP Dynamic IP Addresses • Verify MIP Extensions in RRQ • Verify MIP NAI in RRQ • Verify Reverse Tunneling T-Bit • Verify MIP Registration Response • Verify MN-FA Challenge Extensions in RRP • Verify PPP Data Flow • Verify MIP De-registration • Check for CDMA Release Order

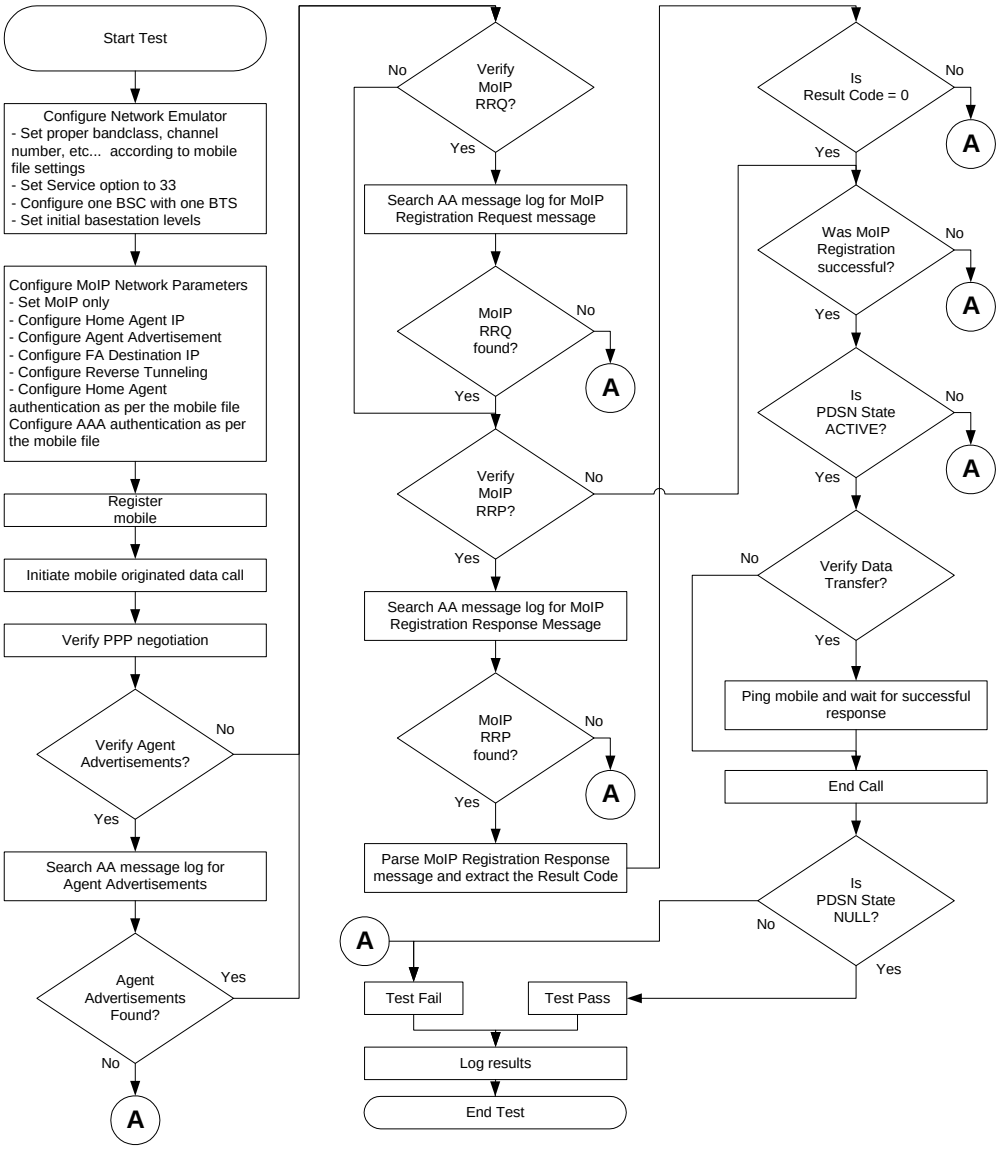
2.8.2.4 Test Results

The following test results are supported for this test:

- Verify PPP Data Link Established
- Verify Agent Advertisement
- Verify Mobile Registration RRQ
- Verify MIP Static IP Address
- Verify T-Bit 1 and Reverse Tunneling Required
- Verify MIP RRP Result Code = 0
- Verify FTP Status
- Verify PDSN NULL State

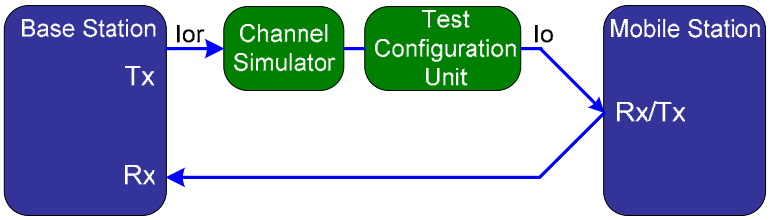
2.8.2.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.8.3. 1X MoIP Registration Error

2.8.3.1 Hardware Configuration



NOTE: The Channel Simulator is not used in this test.

2.8.3.2 Description

There are several different test conditions for MoIP Registration Error tests:

- 4.5 Mobile Station RRQ Failed – HA has Insufficient Resources – This test verifies that when the mobile station initiates a dynamic Mobile IP call, the Mobile IP RRQ is denied due to insufficient HA resources. The HA will not have resources either because the HA address pool is not configured or all IP addresses in the address pool have been exhausted.
- 4.6 Mobile Station Registration Request Retry – This test verifies the mobile station re-sends a Mobile IP Registration Request if the Registration Reply is not received. This test also verifies the mobile station uses a different ID in the new Registration Request. This test also verifies the mobile station and the HA support the mandatory replay protection using timestamps.

2.8.3.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Application Parameters	• Application Type
AirAccess MoIP Parameters	• IP Negotiation Type • CHAP or PAP Preferred
Test Details Parameters	• MoIP registration error • Allow mobile registration retry
Test Criteria	• Verify Agent Advertisements • Verify MoIP RRP response code • Verify MoIP RRQ Identification

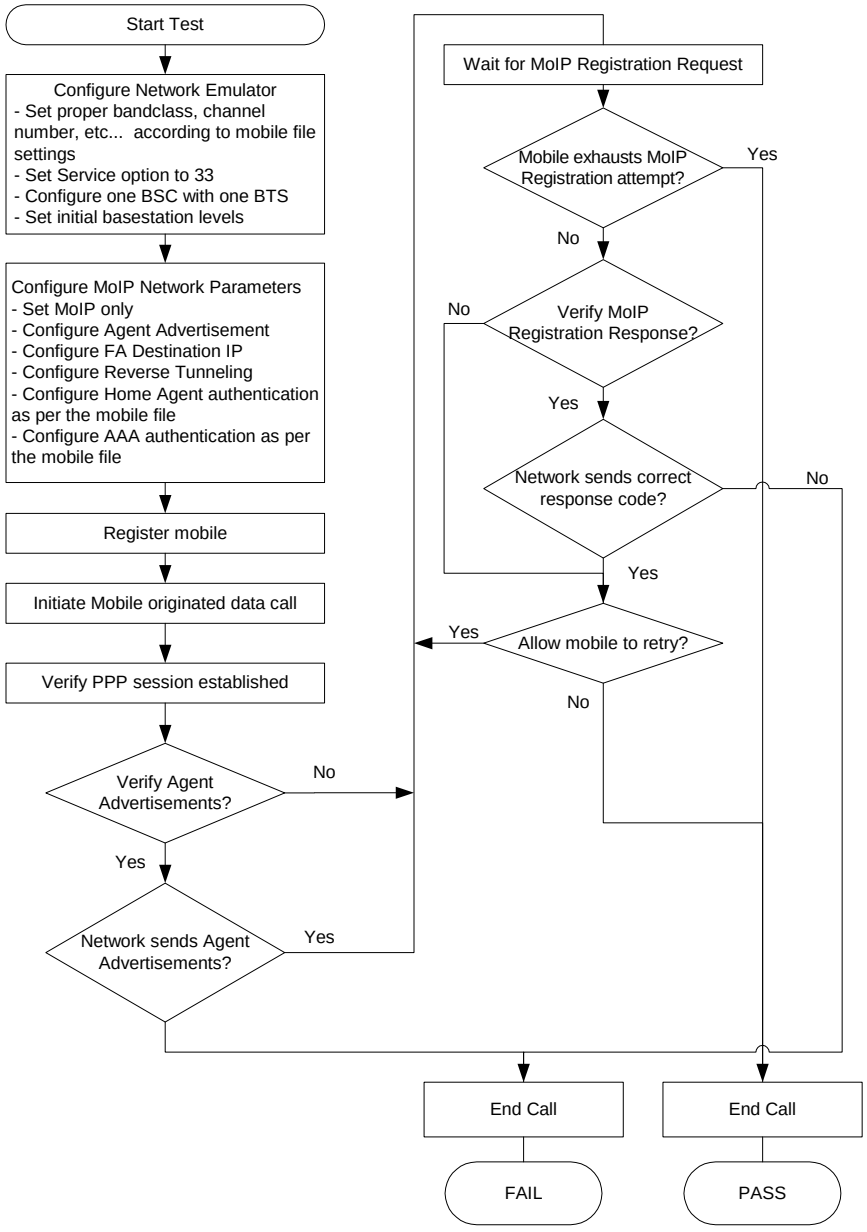
2.8.3.4 Test Results

The following test results are supported for this test:

- Verify Mobile IP Registration Request Identification
- Verify CHAP Negotiated
- Verify MIP to SIP Fallback

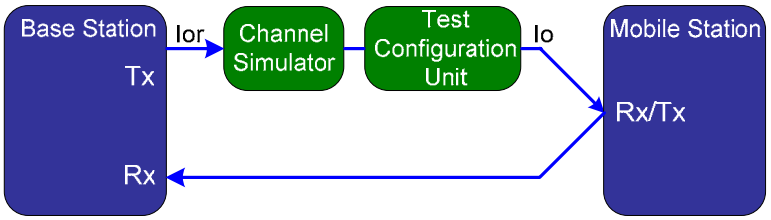
2.8.3.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.8.4. 1X Device Registration Request Retry

2.8.4.1 Hardware Configuration



2.8.4.2 Description

- **4.6 Mobile Station Registration Request Retry** – This test verifies the mobile station re-sends a Mobile IP Registration Request if the Registration Reply is not received. This test also verifies the mobile station uses a different ID in the new Registration Request. This test also verifies the mobile station and the HA support the mandatory replay protection using timestamps.

2.8.4.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Application Parameters	• Application Type
Network Parameters	• IP Negotiation Type

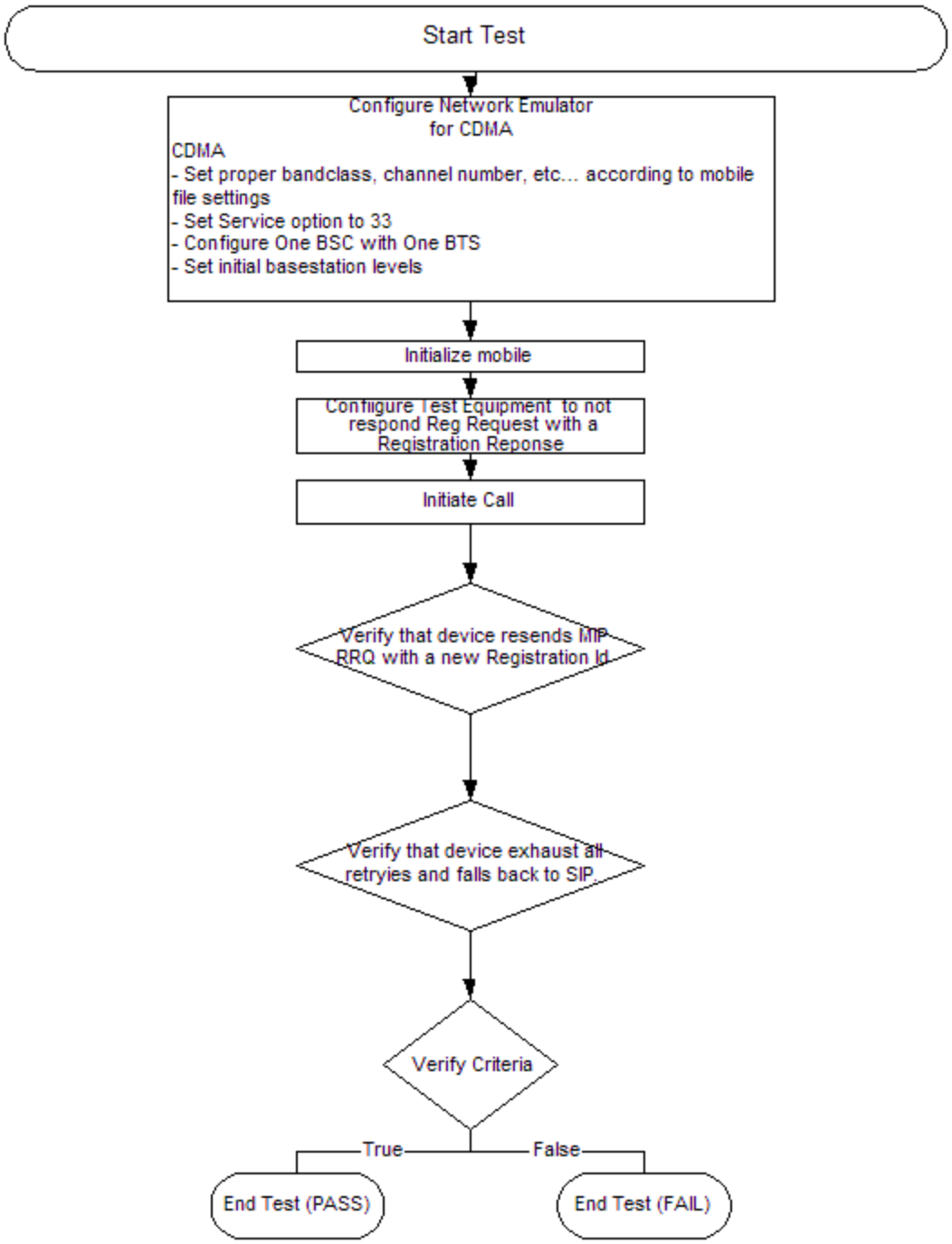
2.8.4.4 Test Results

The following test results are supported for this test:

- Mobile IP Registration Request Count
- Verify Mobile IP Registration Request Identification
- Verify MIP to SIP Fallback

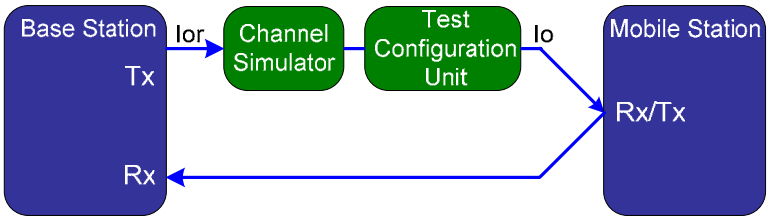
2.8.4.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.8.5. 1X MoIP Registration Lifetime

2.8.5.1 Hardware Configuration



NOTE: The Channel Simulator is not used in this test.

2.8.5.2 Description

- **4.7 Registration Lifetime Processing** – This test verifies the mobile station accepts a Mobile IP Registration Reply with the registration lifetime less than the requested lifetime.

2.8.5.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Application Parameters	• Application Type
Application MoIP Parameters	• HA Registration Lifetime (sec) • FA Registration Lifetime (sec)
Test Details Parameters	• Numbers of Re-registration • Pre-re-registration timer (sec)
Test Criteria	• Verify Agent Advertisements • Verify MoIP RRQ Lifetime • Verify MoIP RRP Lifetime • Verify MoIP RRP response code • Verify PPP Data Flow • Verify MoIP RRQ Challenge value • Verify MIP NAI in RRQ • Verify MoIP Re-registration time • MoIP Re-registration time error (sec)

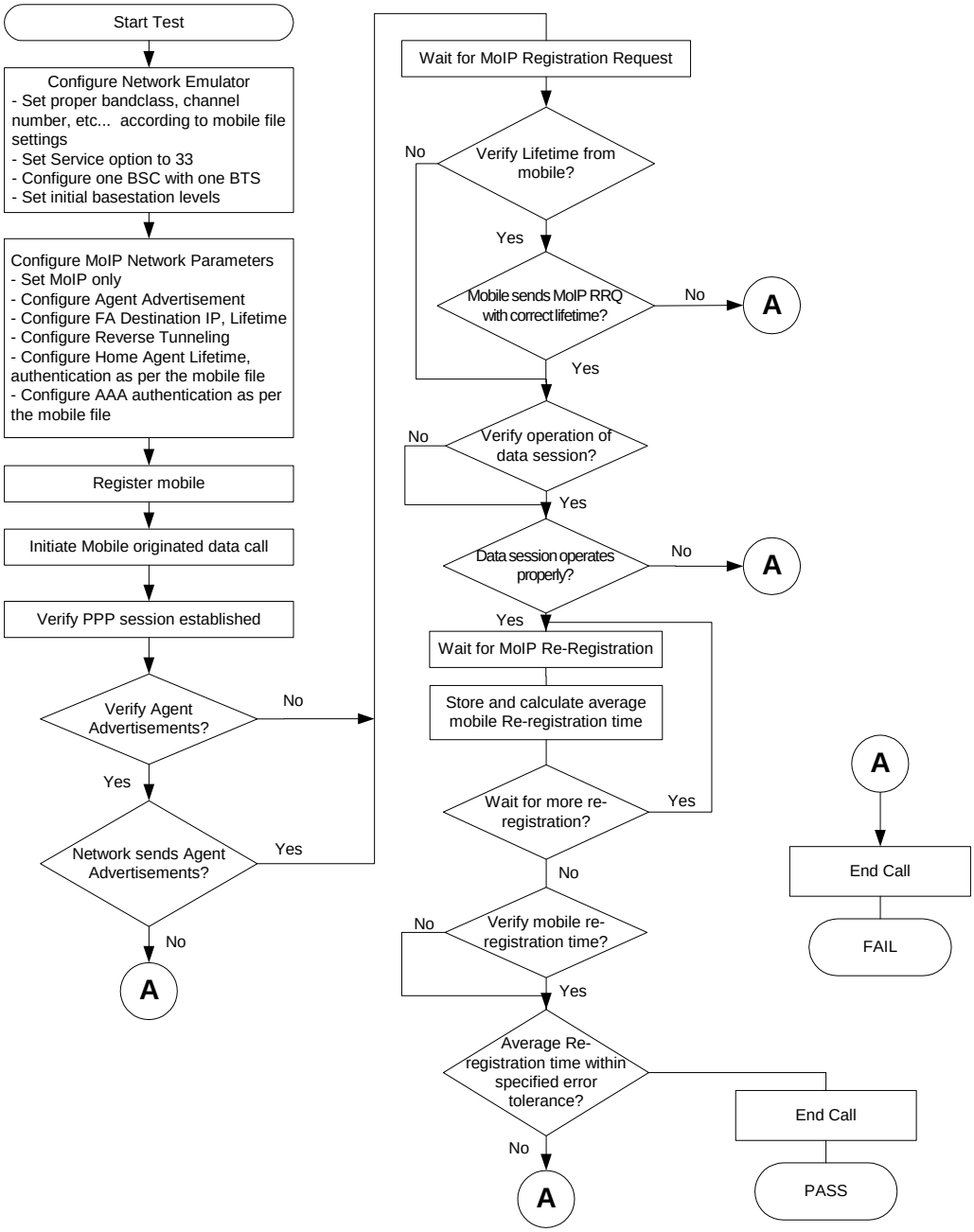
2.8.5.4 Test Results

The following test results are supported for this test:

- Verify Agent Advertisement
- Verify MoIP RRQ Lifetime (sec)
- Verify MoIP RRP Lifetime (sec)
- Verify MIP RRP Result Code = 0
- Verify MIP PPP Traffic
- Verify MN-FA Challenge Extension in RRQ
- Verify Average MoIP Re-registration Time (sec)

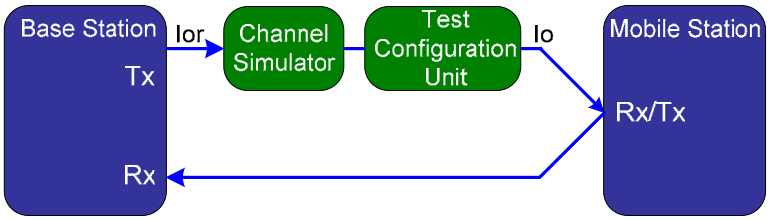
2.8.5.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.8.6. 1X PDSN Handoff

2.8.6.1 Hardware Configuration



NOTE: The Channel Simulator is not used in this test.

2.8.6.2 Description

There are several different test conditions for PDSN Handoff tests:

- 5.1 Inter-PDSN Handoff, Mobile Station in Active State – This test verifies the successful handoff between PDSNs. The Inter-PDSN handoff will result in the establishment of a new PPP session, detection of the new FA and registration with the HA. PDSN 1 is associated with the PCF 1 and PDSN 2 is associated with PCF 2.
- 5.2 Inter-PDSN handoff, Mobile Station in Dormant State – This test verifies the mobile station can be successfully transitioned from the dormant state to the active state in order for an Inter-PDSN handoff to occur.
- 5.3 Intra-PDSN Handoff, Mobile Station in Active State – This test verifies the successful handoff between PCFs on the same PDSN/FA. The Intra-PDSN handoff will result in a continuation of the same PPP session and no Mobile IP registration with the HA.
- 5.4 Intra-PDSN Handoff, Mobile Station in Dormant State – This test verifies the successful handoff between PCFs on the same PDSN/FA while the mobile station is in the dormant state. The Intra-PDSN handoff will result in continuation of the same PPP session and no mobile IP registration with the HA.

2.8.6.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Application Parameters	• Application Type
Levels	• Sector 1 Ior (dBm/1.23MHz) • Sector 2 Ior (dBm/1.23MHz)
Handoff Parameters	• Sector 1 PZID • Sector 2 PZID • Handoff State • Mobile Inactivity Timer (sec) • Handoff Type • Perform Return Handoff
Test Criteria	• Verify Agent Advertisements • Verify Post Handoff RRQ • Verify MIP NAI in RRQ • Verify IP Addresses • Verify PPP Data Flow

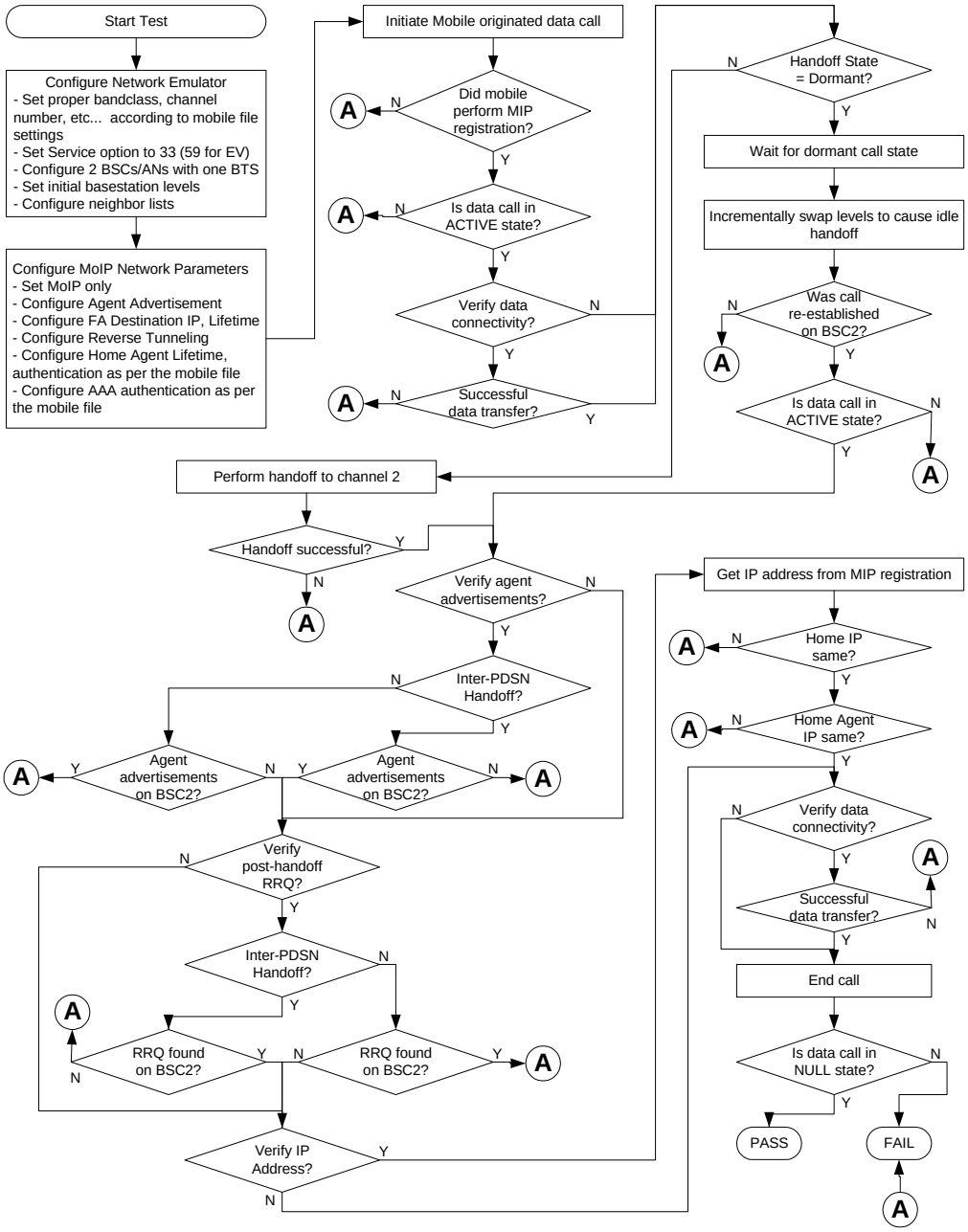
2.8.6.4 Test Results

The following test results are supported for this test:

- Verify Agent Advertisement
- Verify Mobile Registration RRQ
- Verify Post Handoff MS IP Address
- Verify Post Handoff HA IP Address
- Verify MIP PPP Traffic
- Verify InterPDSN Handoff

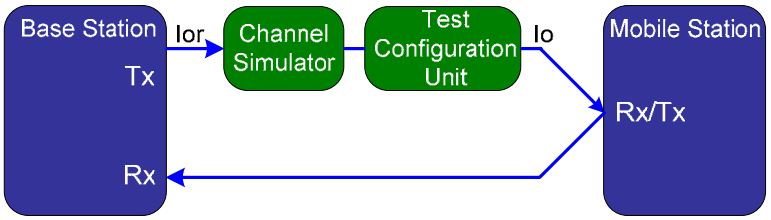
2.8.6.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.8.7. 1X Simple IP Handoff

2.8.7.1 Hardware Configuration



NOTE: The Channel Simulator is not used in this test.

2.8.7.2 Description

- **5.6 Simple IP Intra-Handoff, Mobile Station in Dormant State** – This test verifies the successful Simple IP handoff between PCFs on the same PDSN while the mobile station is in the dormant state. The Intra-PDSN handoff will result in a continuation of the same PPP session and no mobile IP registration with the HA.

2.8.7.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel • IP Negotiation Type • CHAP or PAP Preferred
Application Parameters	• Application Type
Levels	• Sector 1 Ior (dBm/1.23MHz) • Sector 2 Ior (dBm/1.23MHz)
Test Criteria	• Verify PPP Data Flow • Verify IP Addresses

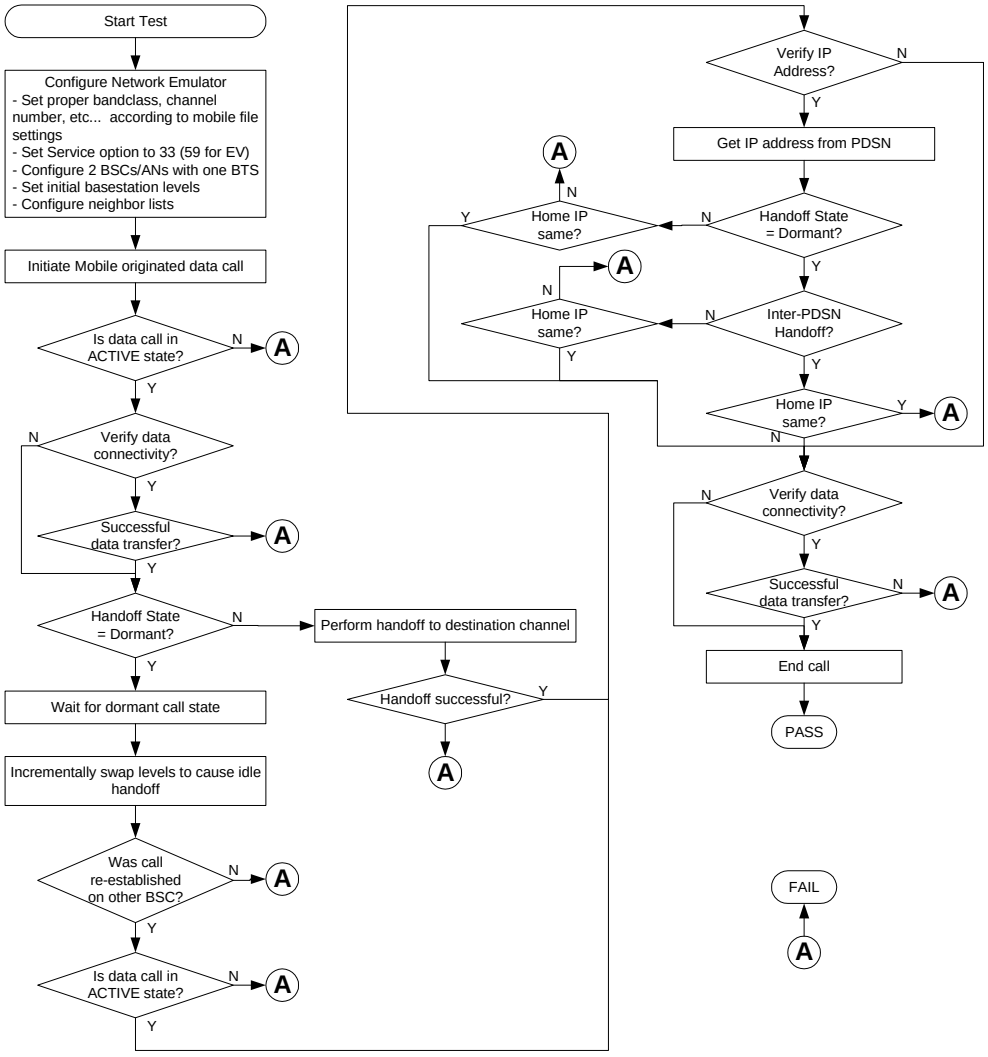
2.8.7.4 Test Results

The following test results are supported for this test:

- Verify Intra PDSN Handoff

2.8.7.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.8.8. Spirent Standard Suites – 1X TIA-918 (C.S0037)

2.8.8.1 1X Test Cases

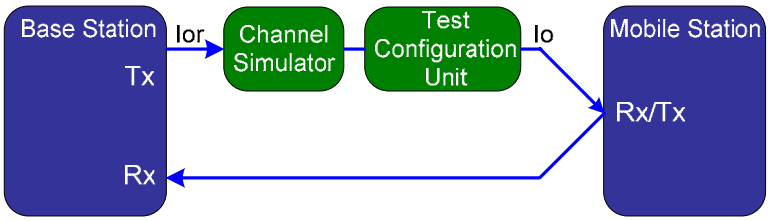
Test Suite #1

All Supported TIA-918 Tests – 1X		
Test #	Test Name	Test Description
1	Simple IP Establishment and file transfer	3.1 Simple IP Establishment without Authentication of the Mobile Station
2	Simple IP Establishment and file transfer	3.2 Simple IP Establishment with CHAP
3	MoIP Call Setup	4.1 Successful PPP Negotiation and Termination
4	MoIP Call Setup	4.2 Agent Discovery and Registration using Dynamic Home Address Assignment
5	MoIP Call Setup	4.3 Agent Discovery and Registration using Static Home Address Assignment
6	MoIP Registration Error	4.5 Mobile Station RRQ Failed – HA has Insufficient Resources
7	MoIP Registration Error	4.6 Mobile Station Registration Request Retry
8	Device Registration Request Retry	4.6 Mobile Station Registration Request Retry
9	MoIP Registration Lifetime	4.7 Registration Lifetime Processing
10	MoIP Call Setup	4.9 Mobile Station De-Registers
11	PDSN Handoff	5.1 Inter-PDSN Handoff, Mobile Station in Active State
12	PDSN Handoff	5.2 Inter-PDSN Handoff, Mobile Station in Dormant State
13	PDSN Handoff	5.3 Inter-PDSN Handoff, Mobile Station in Active State
14	PDSN Handoff	5.4 Intra-PDSN Handoff, Mobile Station in Dormant State
15	Simple IP Handoff	5.6 Simple IP Intra-PDSN Handoff, Mobile Station in Dormant State
16	MoIP Call Setup	6.6 Private Network Support, Successful Scenario

2.9. EV-DO TIA-918 (C.S0037) Test Cases

2.9.1. EV-DO Simple IP Establishment and File Transfer

2.9.1.1 Hardware Configuration



2.9.1.2 Description

There are several different test conditions for Simple IP Establishment and File Transfer tests:

- 3.1 Simple IP Establishment without Authentication of the Mobile Station – If the mobile station can be configured to not use CHAP or PAP authentication, this test verifies that the mobile station and PDSN can successfully negotiate a PPP session during a Simple IP session. This test verifies the mobile station can successfully terminate the PPP session.
- 3.2 Simple IP Establishment with CHAP – This test verifies the proper operation of Simple IP with CHAP authentication. This test verifies the mobile station can terminate the PPP session.

2.9.1.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Application Parameters	• Application Type
Network Parameters	• EV-DO Revision • EV-DO Packet Type Configuration • IP Negotiation Type • Um PPP Authentication • CHAP or PAP Preferred • HA AAA Shared Secret Mismatch

Test Parameters	
Pass/Fail Criteria	• Verify MIP NAI in RRQ • Perform FTP

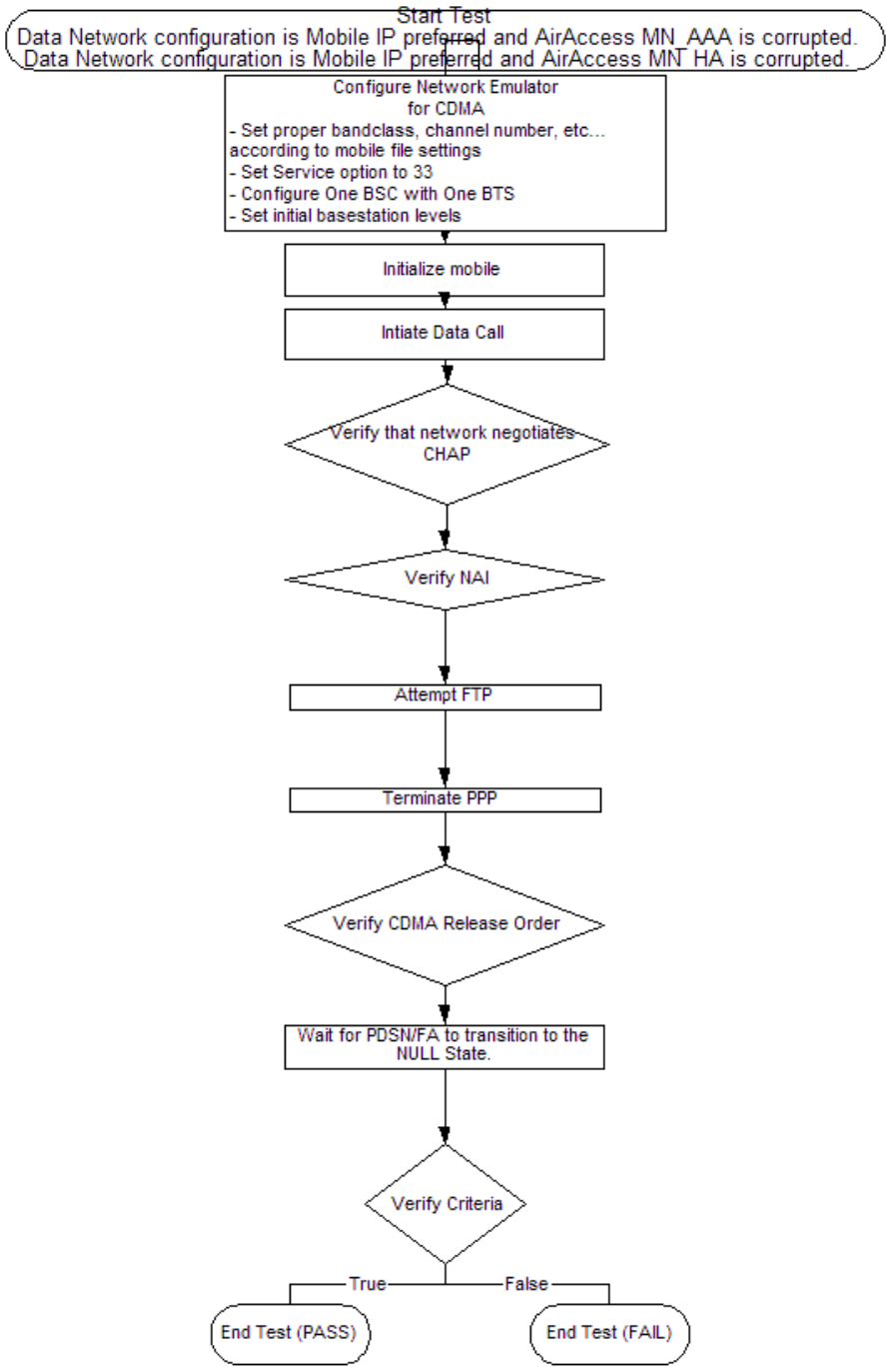
2.9.1.4 Test Results

The following test results are supported for this test:

- Verify MIP to SIP Fallback
- Verify CHAP Negotiated
- Verify NAI Valid
- Verify FTP Status
- Verify LCP Termination Request
- Verify CDMA Release Order
- Verify PDSN NULL State

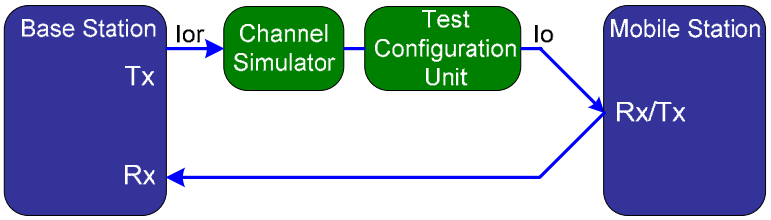
2.9.1.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.9.2. EV-DO MoIP Call Setup

2.9.2.1 Hardware Configuration



NOTE: The Channel Simulator is not used in this test.

2.9.2.2 Test Description

There are several different test conditions for MoIP Call Setup tests:

- 4.1 Successful PPP Negotiation and Termination – This test verifies that the mobile station and PDSN/FA can successfully negotiate a PP session when initiating a Mobile IP call. This test verifies the mobile station will not include an IP-Address Configuration Option in the IPCP Configure-Request and PDSN shall not assign an IP address to the mobile station in IPCP. This test also verifies the mobile station can successfully terminate the PPP session.
- 4.2 Agent Discovery and Registration using Dynamic Home Address Assignment – This test verifies that the PDSN/FA sends Agent Advertisements upon the establishment of a PPP Session and the mobile station processes the Agent Advertisement correctly. The Mobile IP Registration Request (RRQ) and Mobile IP Registration Reply (RRP) process is verified.
- 4.3 Agent Discovery and Registration using Static Home Address Assignment – This test verifies that the PDSN/FA sends Agent Advertisements upon the establishment of a PPP Session and the mobile station processes the Agent Advertisement correctly. This test also verifies the Mobile IP Registration Request (RRQ) and Mobile IP Registration Reply (RRP) are processed correctly.
- 4.9 Mobile Station De-Registers – If the mobile stations supports de-registration, perform this test to verify the mobile station is able to de-register by setting the registration lifetime to 0 in the Mobile IP RRQ.
- 6.6 Private Network Support, Successful Scenario – This test verifies mobile station and PDSN/FA support private home addresses.

2.9.2.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Application Parameters	• Application Type
Network Parameters	• IP Negotiation Type • EV-DO Revision • EV-DO Packet Type Configuration • IP Address Assignment Type • Configure Dynamic Mobile Home IP Address Pool
Test Criteria	• Verify Agent Advertisements • Verify Agent Advertisement Challenge Extensions • Verify Mobile Registration Request • Verify MIP Dynamic IP Addresses • Verify MIP Extensions in RRQ • Verify MIP NAI in RRQ • Verify Reverse Tunneling T-Bit • Verify MIP Registration Response • Verify MN-FA Challenge Extensions in RRP • Verify PPP Data Flow • Verify MIP De-registration

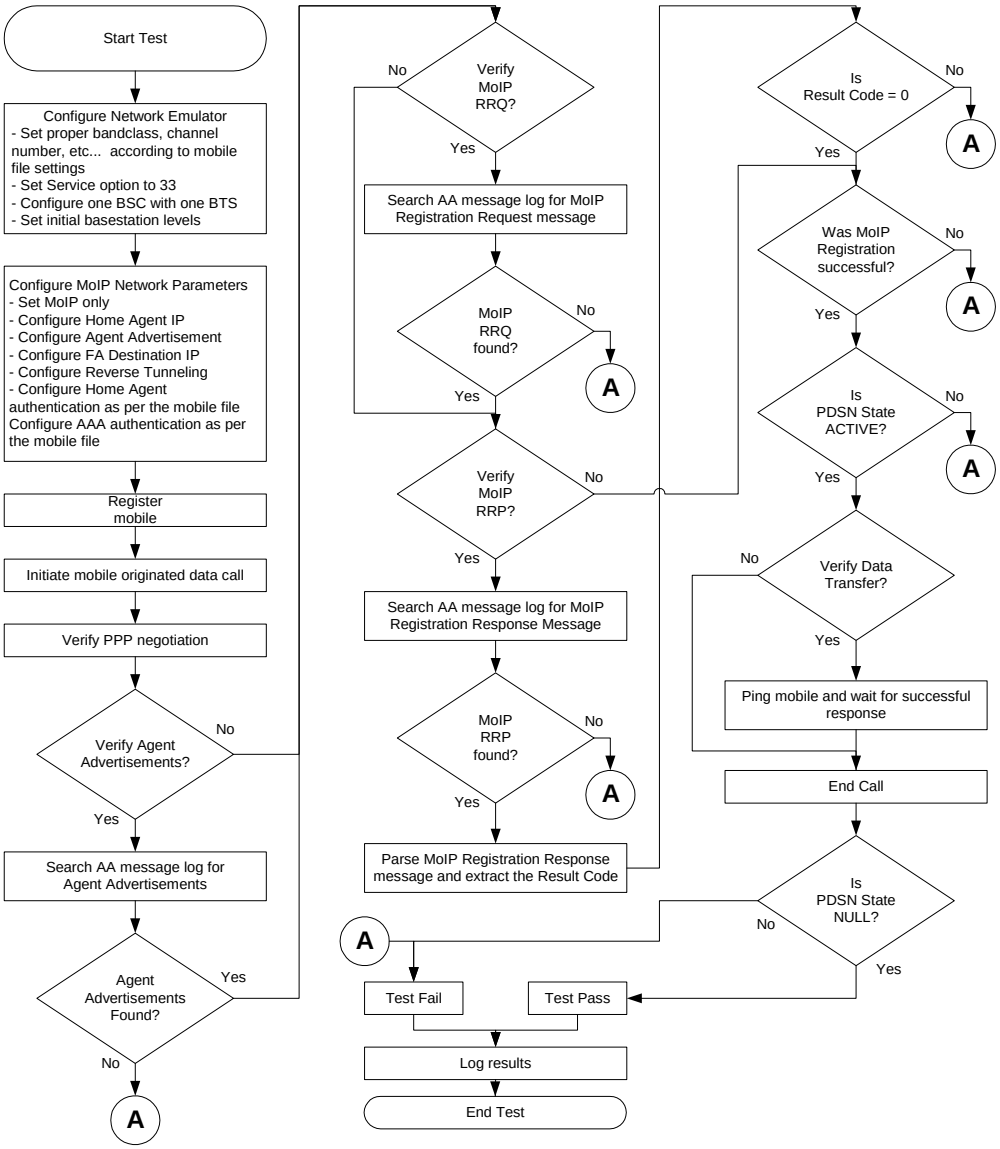
2.9.2.4 Test Results

The following test results are supported for this test:

- Verify PPP Data Link Established
- Verify Agent Advertisement
- Verify Mobile Registration RRQ
- Verify MIP Static IP Address
- Verify T-Bit 1 and Reverse Tunneling Required
- Verify MIP RRP Result Code = 0
- Verify FTP Status
- Verify PDSN NULL State

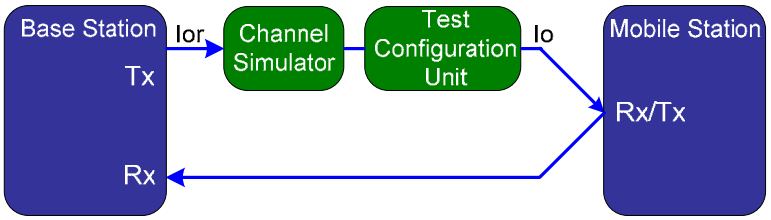
2.9.2.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.9.3. EV-DO MoIP Registration Error

2.9.3.1 Hardware Configuration



NOTE: The Channel Simulator is not used in this test.

2.9.3.2 Description

There are several different test conditions for MoIP Registration Error tests:

- 4.5 Mobile Station RRQ Failed – HA has Insufficient Resources – This test verifies that when the mobile station initiates a dynamic Mobile IP call, the Mobile IP RRQ is denied due to insufficient HA resources. The HA will not have resources either because the HA address pool is not configured or all IP addresses in the address pool have been exhausted.
- 4.6 Mobile Station Registration Request Retry – This test verifies the mobile station re-sends a Mobile IP Registration Request if the Registration Reply is not received. This test also verifies the mobile station uses a different ID in the new Registration Request. This test also verifies the mobile station and the HA support the mandatory replay protection using timestamps.

2.9.3.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Application Parameters	• Application Type
AirAccess MoIP Parameters	• IP Negotiation Type • CHAP or PAP Preferred
Test Details Parameters	• MoIP registration error • Allow mobile registration retry
Test Criteria	• Verify Agent Advertisements • Verify MoIP RRP response code • Verify MoIP RRQ Identification

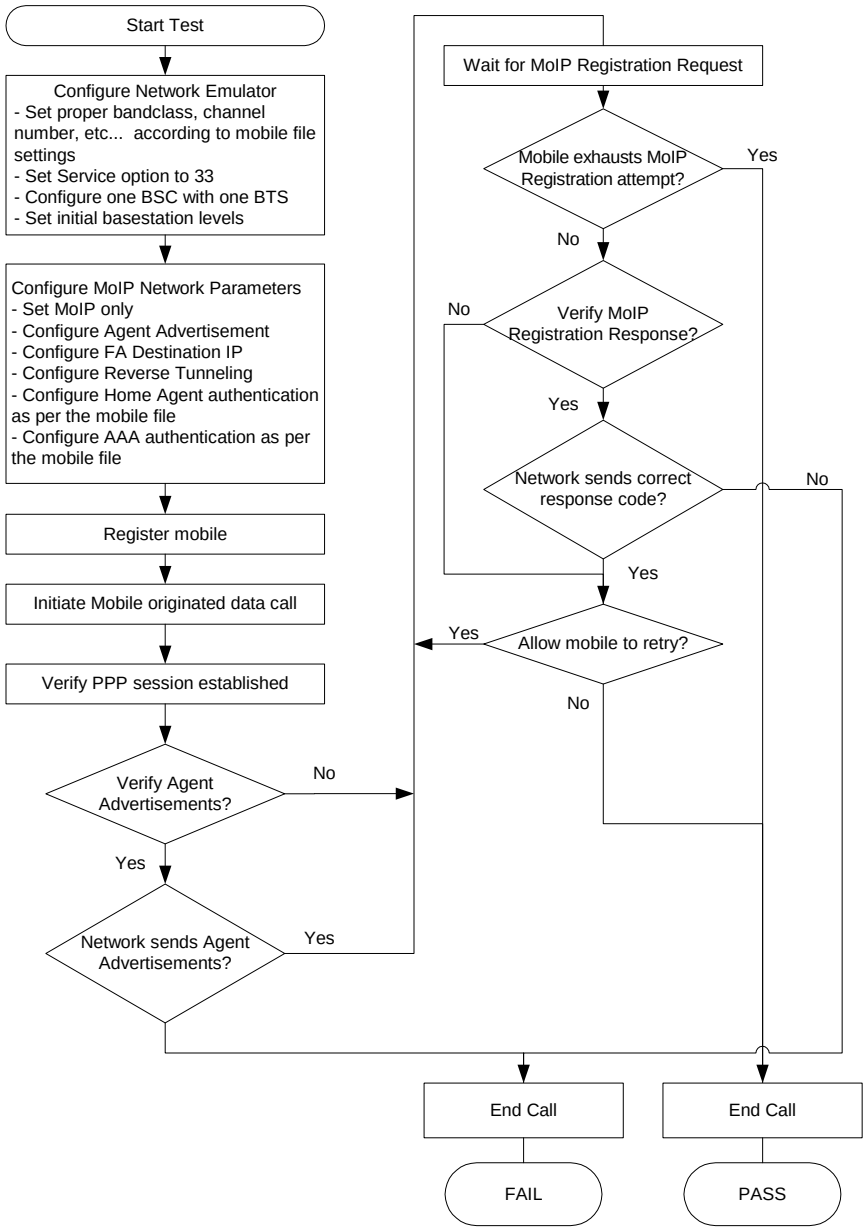
2.9.3.4 Test Results

The following test results are supported for this test:

- Verify Mobile IP Registration Request Identification
- Verify CHAP Negotiated
- Verify MIP to SIP Fallback

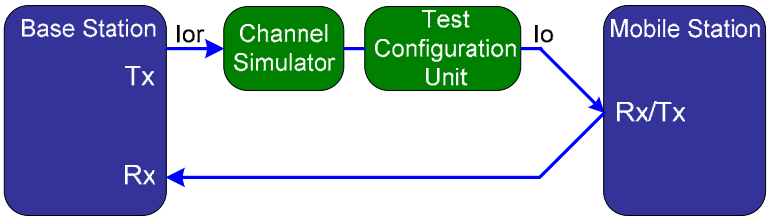
2.9.3.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.9.4. EV-DO Device Registration Request Retry

2.9.4.1 Hardware Configuration



2.9.4.2 Description

- **4.6 Mobile Station Registration Request Retry** – This test verifies the mobile station re-sends a Mobile IP Registration Request if the Registration Reply is not received. This test also verifies the mobile station uses a different ID in the new Registration Request. This test also verifies the mobile station and the HA support the mandatory replay protection using timestamps.

2.9.4.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Application Parameters	• Application Type
Network Parameters	• IP Negotiation Type

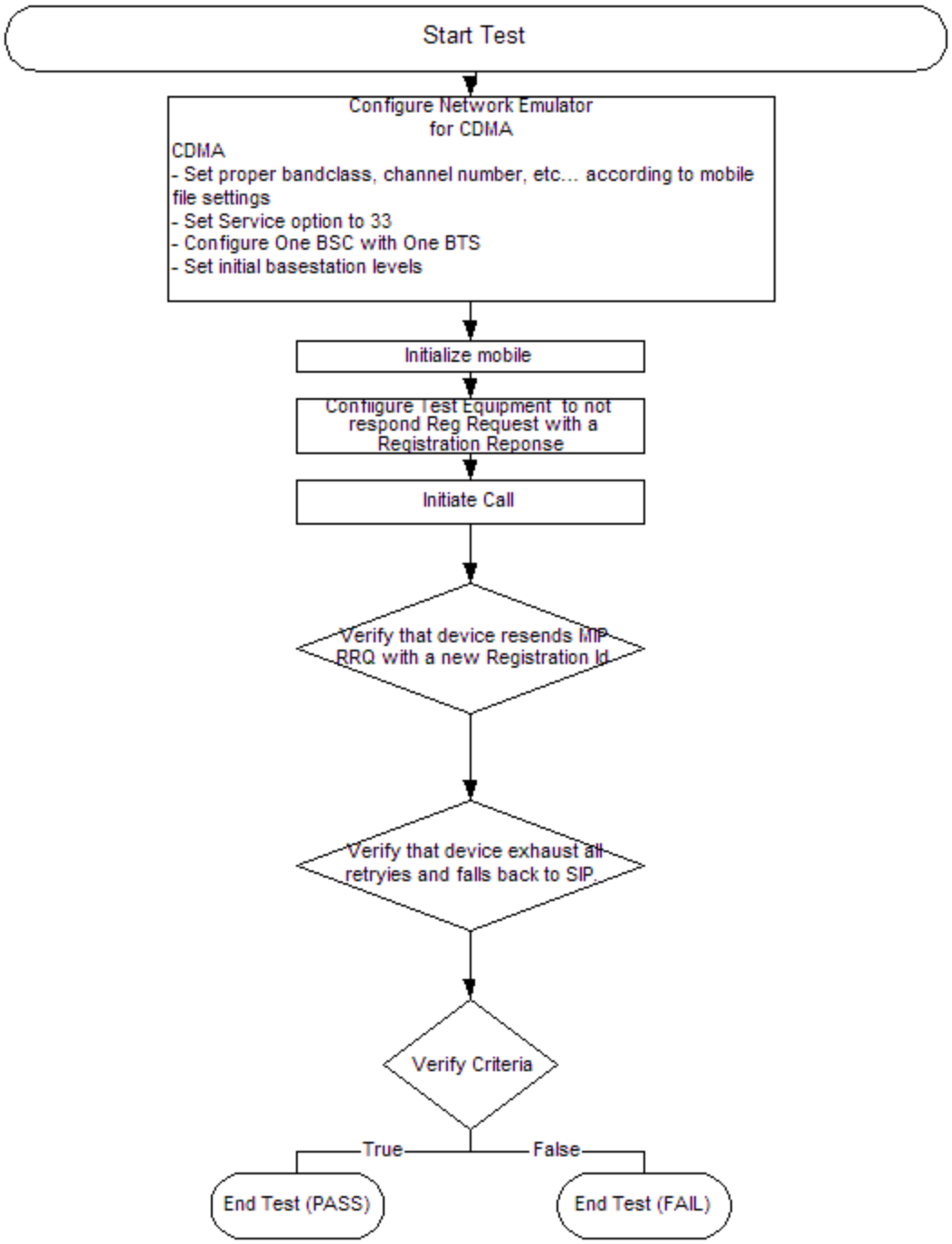
2.9.4.4 Test Results

The following test results are supported for this test:

- Mobile IP Registration Request Count
- Verify Mobile IP Registration Request Identification
- Verify MIP to SIP Fallback

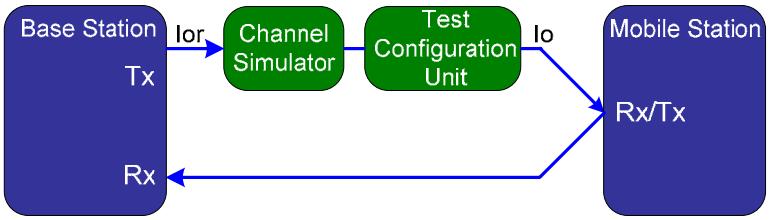
2.9.4.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.9.5. EV-DO MoIP Registration Lifetime

2.9.5.1 Hardware Configuration



NOTE: The Channel Simulator is not used in this test.

2.9.5.2 Description

- **4.7 Registration Lifetime Processing** – This test verifies the mobile station accepts a Mobile IP Registration Reply with the registration lifetime less than the requested lifetime.

2.9.5.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General Parameters	• Title • Description • Loop On Channel
Application Parameters	• Application Type
Application MoIP Parameters	• HA Registration Lifetime (sec) • FA Registration Lifetime (sec)
Test Details Parameters	• Numbers of Re-registration • Pre-re-registration timer (sec)
Test Criteria	• Verify Agent Advertisements • Verify MoIP RRQ Lifetime • Verify MoIP RRP Lifetime • Verify MoIP RRP response code • Verify PPP Data Flow • Verify MoIP RRQ Challenge value • Verify MIP NAI in RRQ • Verify MoIP Re-registration time • MoIP Re-registration time error (sec)

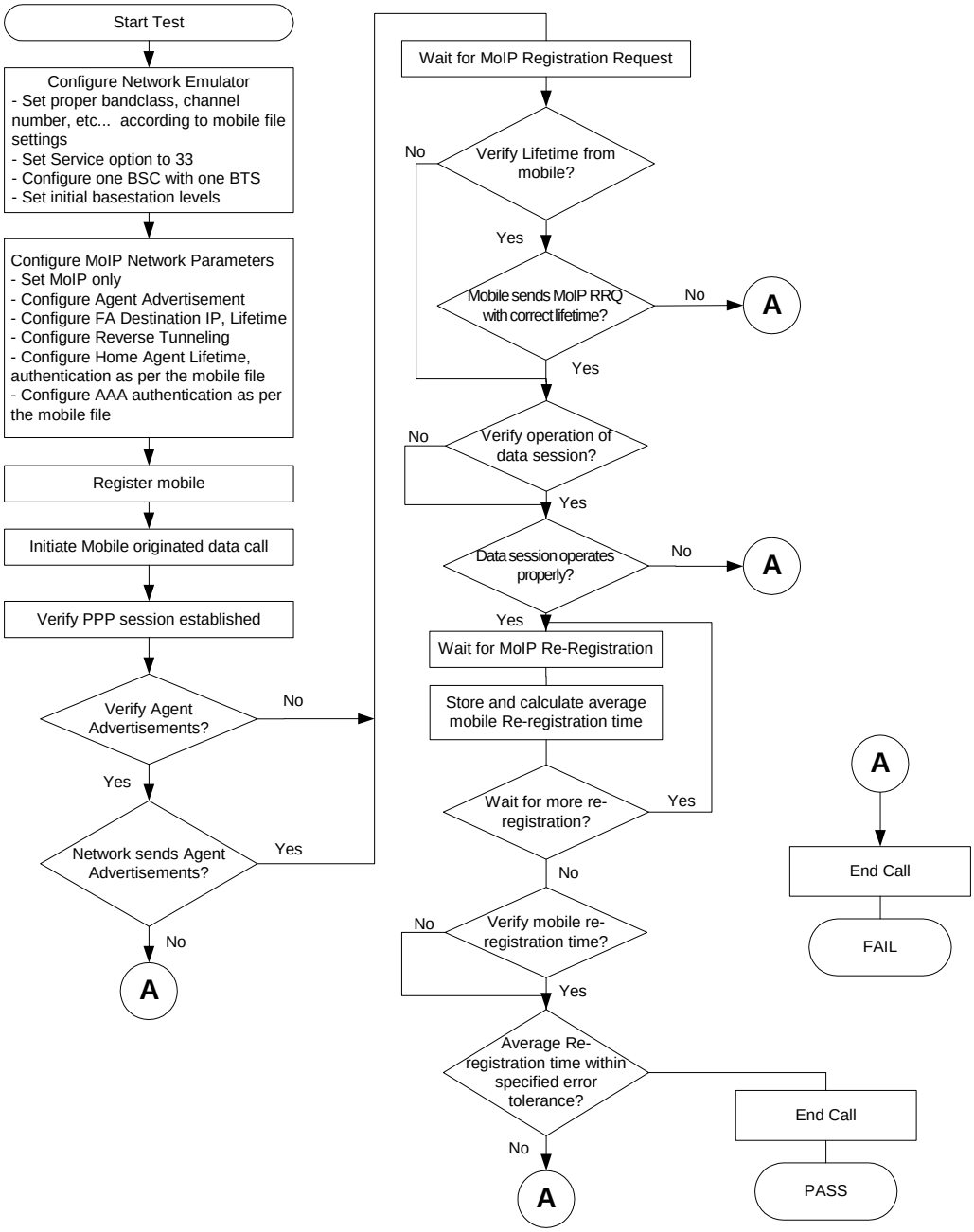
2.9.5.4 Test Results

The following test results are supported for this test:

- Verify Agent Advertisement
- Verify MoIP RRQ Lifetime (sec)
- Verify MoIP RRP Lifetime (sec)
- Verify MIP RRP Result Code = 0
- Verify MIP PPP Traffic
- Verify MN-FA Challenge Extension in RRQ
- Verify Average MoIP Re-registration Time (sec)

2.9.5.5 Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.9.6. Spirent Standard Suites – EV-DO TIA-918 (C.S0037)

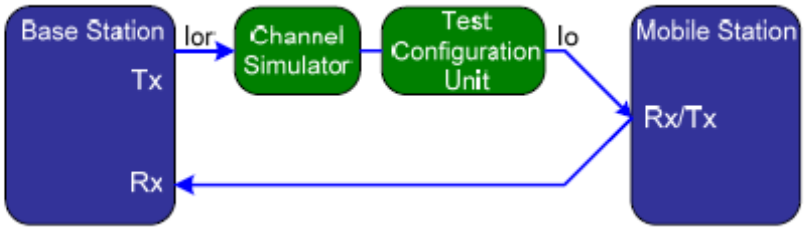
2.9.6.1 EV-DO Test Cases

Test Suite #1

All Supported TIA-918 Tests – EV-DO		
Test #	Test Name	Test Description
1	EV-DO Simple IP Establishment and file transfer	3.1 Simple IP Establishment without Authentication of the Mobile Station
2	EV-DO Simple IP Establishment and file transfer	3.2 Simple IP Establishment with CHAP
3	EV-DO MoIP Call Setup	4.1 Successful PPP Negotiation and Termination
4	EV-DO MoIP Call Setup	4.2 Agent Discovery and Registration using Dynamic Home Address Assignment
5	EV-DO MoIP Call Setup	4.3 Agent Discovery and Registration using Static Home Address Assignment
6	EV-DO MoIP Registration Error	4.5 Mobile Station RRQ Failed – HA has Insufficient Resources
7	EV-DO MoIP Registration Error	4.6 Mobile Station Registration Request Retry
8	EV-DO Device Registration Request Retry	4.6 Mobile Station Registration Request Retry
9	EV-DO MoIP Registration Lifetime	4.7 Registration Lifetime Processing
10	EV-DO MoIP Call Setup	4.9 Mobile Station De-Registers
11	EV-DO MoIP Call Setup	6.6 Private Network Support, Successful Scenario

2.10. 1X Data Throttling Test Cases

2.10.1. Hardware Configuration



NOTE: The Channel Simulator is optional for this test.

2.10.2. Description

- 3.1 1xRTT Paging Channel Failure: Intercept Order – This test case verifies a device's throttling behavior when the device originates a 1xRTT data call (SO33) and the network responds with an Intercept Order message. This test also verifies that the throttling behavior is cleared by a successful call completion.
- 3.2 1xRTT Paging Channel Failure: Release Order with ORDQ=2 – This test case verifies a device's throttling behavior when the device originates a 1xRTT data call (SO33) and the network responds with a Release Order (ORDQ=2) message. This test also verifies that the throttling behavior is cleared by a successful call completion.
- 3.3 1xRTT Paging Channel Failure: Throttling Cleared by Subnet Change – This test case verifies that the throttling behavior is cleared by the "Subnet Change" clearing events. This test case uses the throttling event of an "Intercept Order".
- 3.4.2 1xRTT Paging Channel Failure: Throttling Cleared by Power Cycle – This test case verifies that the throttling behavior is cleared by the "Power Cycle" clearing events. This test case uses the throttling event of an "Intercept Order".
- 3.4.3 1xRTT Paging Channel Failure: Throttling Cleared by Soft Reset – This test case verifies that the throttling behavior is cleared by the "Soft Reset" clearing events. This test case uses the throttling event of an "Intercept Order".
- 3.4.4 1xRTT Paging Channel Failure: Throttling Cleared by OTASP – This test case verifies that the throttling behavior is cleared by the "OTASP Call" clearing events. This test case uses the throttling event of an "Intercept Order".
- 3.4.5 1xRTT Paging Channel Failure: Throttling Cleared by OTAPA – This test case verifies that the throttling behavior is cleared by the "OTAPA Call" clearing events. This test case uses the throttling event of an "Intercept Order".

- **3.5 1xRTT Traffic Channel Failure: Release Order with ORDQ=2** – This test verifies throttling functionality for the case in which the device is on a 1xRTT–only system and the network responds to an SO 33 Origination by sending a CDMA Release Order with ORDQ=2 (Service Option Rejected) on the Traffic Channel. This test also verifies that the throttling behavior is cleared by a successful call completion.
- **3.6.3 1xRTT Traffic Channel Failure: Throttling Cleared by a Power Cycle** – This test case verifies that the throttling behavior is cleared by the "Power Cycle" clearing events. This test case uses the throttling event the CDMA Release Order with ORDQ=2 (Service Option Rejected) on Traffic Channel.
- **3.6.4 1xRTT Traffic Channel Failure: Throttling Cleared by Soft Reset** – This test case verifies that the throttling behavior is cleared by the "Soft Reset" clearing events. This test case uses the throttling event the CDMA Release Order with ORDQ=2 (Service Option Rejected) on Traffic Channel.
- **3.6.5 1xRTT Traffic Channel Failure: Throttling Cleared by OTASP** – This test case verifies that the throttling behavior is cleared by the "OTASP Call" clearing events. This test case uses the throttling event the CDMA Release Order with ORDQ=2 (Service Option Rejected) on Traffic Channel.
- **3.6.6 1xRTT Traffic Channel Failure: Throttling Cleared by OTAPA** – This test case verifies that the throttling behavior is cleared by the "OTAPA Call" clearing events. This test case uses the throttling event the CDMA Release Order with ORDQ=2 (Service Option Rejected) on Traffic Channel.
- **3.6.8 1xRTT Traffic Channel Failure: Throttling Cleared by IMSI Change** – This test case verifies that the throttling behavior is cleared by the "IMSI Change" clearing events. This test case uses the throttling event the CDMA Release Order with ORDQ=2 (Service Option Rejected) on Traffic Channel.
- **3.6.9 1xRTT Traffic Channel Failure: Throttling Cleared by MIN Change** – This test case verifies that the throttling behavior is cleared by the "MIN Change" clearing events. This test case uses the throttling event the CDMA Release Order with ORDQ=2 (Service Option Rejected) on Traffic Channel.
- **3.6.10 1xRTT Traffic Channel Failure: Throttling Cleared by MDN Change**– This test case verifies that the throttling behavior is cleared by the "MDN Change" clearing events. This test case uses the throttling event the CDMA Release Order with ORDQ=2 (Service Option Rejected) on Traffic Channel.
- **3.7 1xRTT IP Related Failure: AAA Authentication Failure** – This test case verifies a device's throttling behavior when the device originates a 1xRTT data call (SO33) and the network responds with an AAA Authentication Failure. This test also verifies that the throttling behavior is cleared by a successful call completion.
- **3.8 1xRTT IP Related Failure: LCP Setup Failure** – This test case verifies a device's throttling behavior when the device originates a 1xRTT data call (SO33) and the network does not respond to any LCP configuration request messages. This test also verifies that the throttling behavior is cleared by a successful call completion.
- **3.9 1xRTT IP Related Failure: IPCP Setup Failure** – This test case verifies a device's throttling behavior when the device originates a 1xRTT data call (SO33) and the network does not respond to any IPCP setup messages. This test also verifies that the throttling behavior is cleared by a successful call completion.

- 3.10 1xRTT IP Related Failure: MIP Agent Solicitation Failure – This test case verifies a device's throttling behavior when the device originates a 1xRTT data call (SO33) and the network fails to respond to MIP Agent Solicitation Request messages. This test also verifies that the throttling behavior is cleared by a successful call completion.
- 3.11 1xRTT IP Related Failure: MIP RRQ Failure – This test case verifies a device's throttling behavior when the device originates a 1xRTT data call (SO33) and the network fails to respond to MIP RRQ. This test also verifies that the throttling behavior is cleared by a successful call completion.
- 3.12.3 1xRTT IP Related Failure: Throttling Cleared by a Power Cycle – This test case verifies that the throttling behavior is cleared by the "Power Cycle" clearing events. This test case uses the throttling event AAA Authentication Failure in response to an SO 33 origination on a 1xRTT data network.
- 3.12.4 1xRTT IP Related Failure: Throttling Cleared by Soft Reset – This test case verifies that the throttling behavior is cleared by the "Soft Reset" clearing events. This test case uses the throttling event AAA Authentication Failure in response to an SO 33 origination on a 1xRTT data network.
- 3.12.5 1xRTT IP Related Failure: Throttling Cleared by OTASP – This test case verifies that the throttling behavior is cleared by the "OTASP Call" clearing events. This test case uses the throttling event AAA Authentication Failure in response to an SO 33 origination on a 1xRTT data network.
- 3.12.61xRTT IP Related Failure: Throttling Cleared by OTAPA – This test case verifies that the throttling behavior is cleared by the "OTAPA Call" clearing events. This test case uses the throttling event AAA Authentication Failure in response to an SO 33 origination on a 1xRTT data network.

2.10.3. Test Parameters

Test Parameters	
General Parameters	• Title • Description
Application Parameters	• Data Call Initiator • 1x RTT RAN Failure • ORDQ • AAA Failure • HA Failure • HA Error Code • FA Failure • FA Error Code • PDSN Failure • Test Duration Unit • Test Duration (Steps) • Test Duration (Min) • Method to Clear Throttling • OTAPA Dial Number

Test Parameters	
	• MDN/IMSI/MIN Change Method • Retry Wait Window (Secs)
Network Parameters	• IP Negotiation Type

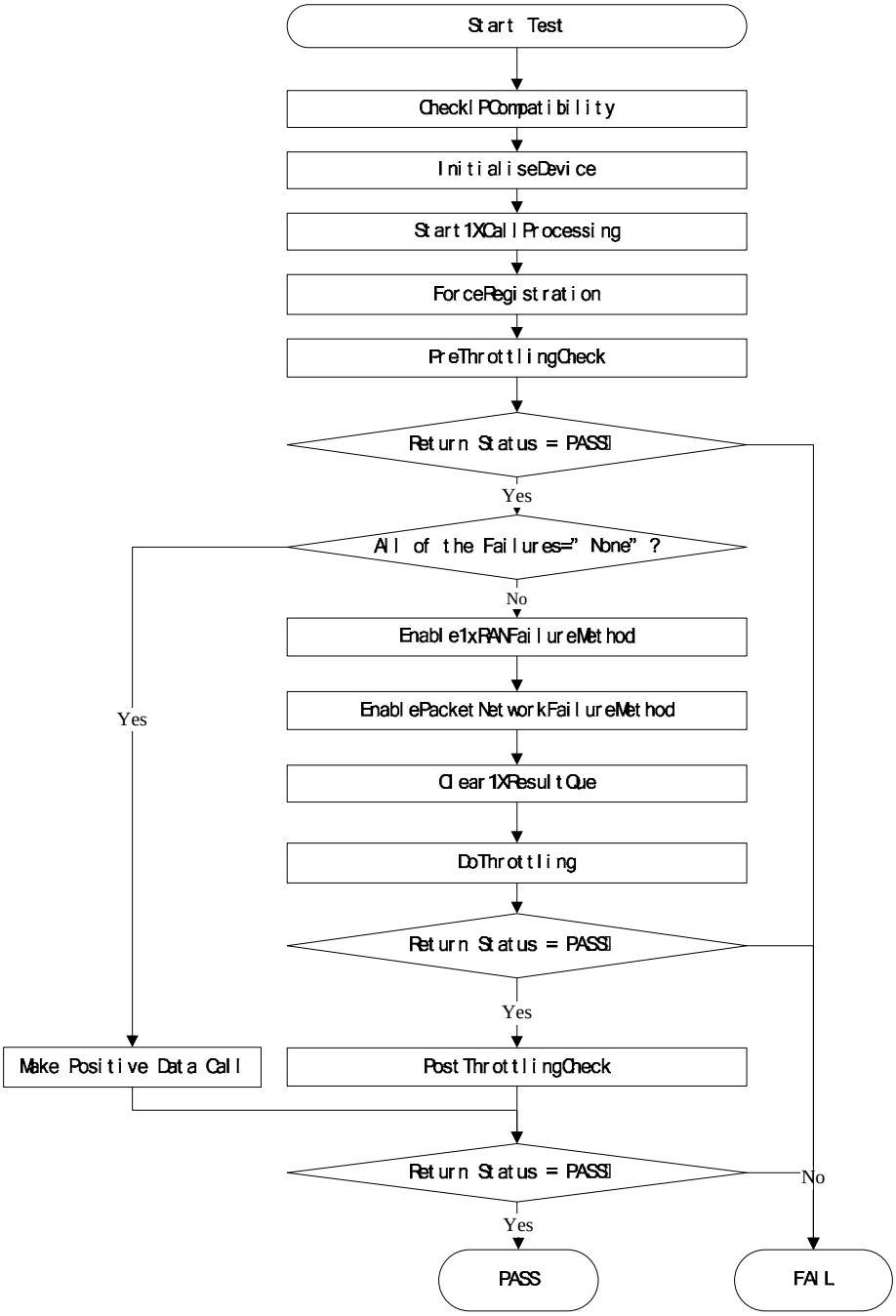
2.10.4. Test Results

The following test results are supported for this test:

- Positive Data Call Status
- Throttling Check Status
- Post-Throttling Check Status

2.10.5. Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.10.6. Spirent Sample Test Suites – 1X Data Throttling

DUN Applications

Test Suites #1

Data Session Throttling Test Case Specification-1.0.0 - 1xRTT DUN Test Cases Only		
Test #	Test Name	Test Description
1	1xRTT Data Throttling	3.1 1xRTT Paging Channel Failure: Intercept Order Message - DUN
2	1xRTT Data Throttling	3.2 1xRTT Paging Channel Failure: Release Order with ORDQ=2 (Service Option Rejected) on the Paging Channel - DUN
3	1xRTT Data Throttling	3.3 1xRTT Paging Channel Throttling Cancelled by 1xRTT Subnet Change - DUN
4	1xRTT Data Throttling	3.4.2 1xRTT Paging Channel Throttling Cancelled by a Power Cycle - DUN
5	1xRTT Data Throttling	3.4.3 1xRTT Paging Channel Throttling Cancelled by a Soft Reset - DUN
6	1xRTT Data Throttling	3.4.4 1xRTT Paging Channel Throttling Cancelled by a Successful OTASP Session - DUN
7	1xRTT Data Throttling	3.4.5 1xRTT Paging Channel Throttling Cancelled by a Successful OTAPA Session - DUN
8	1xRTT Data Throttling	3.5 1xRTT Traffic Channel Failure: Release Order with ORDQ=2 (Service Option Rejected) on the Traffic Channel - DUN
9	1xRTT Data Throttling	3.6.3 1xRT Traffic Channel Throttling Cleared by a Power Cycle - DUN
10	1xRTT Data Throttling	3.6.4 1xRT Traffic Channel Throttling Cleared by a Soft Reset - DUN
11	1xRTT Data Throttling	3.6.5 1xRT Traffic Channel Throttling Cleared by a Successful OTASP Session - DUN
12	1xRTT Data Throttling	3.6.6 1xRT Traffic Channel Throttling Cleared by a Successful OTAPA Session - DUN
13	1xRTT Data Throttling	3.6.8 1xRT Traffic Channel Throttling Cleared by an IMSI Change - DUN
14	1xRTT Data Throttling	3.6.9 1xRT Traffic Channel Throttling Cleared by a MIN Change - DUN
15	1xRTT Data Throttling	3.6.10 1xRT Traffic Channel Throttling Cleared by a MDN Change - DUN
16	1xRTT Data Throttling	3.7 1xRTT IP Related Failure: AAA Authentication Failure – DUN
17	1xRTT Data Throttling	3.8 1xRTT IP Related Failure: LCP Setup Failure during PPP Negotiation - DUN

Data Session Throttling Test Case Specification-1.0.0 - 1xRTT DUN Test Cases Only		
18	1xRTT Data Throttling	3.9 1xRTT IP Related Failure: IPCP Setup Failure during PPP Negotiation - DUN
19	1xRTT Data Throttling	3.10 1xRTT IP Related Failure: MIP Agent Advertisement Failure - DUN
20	1xRTT Data Throttling	3.11 1xRTT IP Related Failure: MIP RRQ Failure - DUN
21	1xRTT Data Throttling	3.12.3 1xRTT IP Related Throttling Cleared by a Power Cycle - DUN
22	1xRTT Data Throttling	3.12.4 1xRTT IP Related Throttling Cleared by a Soft Reset – DUN
23	1xRTT Data Throttling	3.12.5 1xRTT IP Related Throttling Cleared by a Successful OTASP Session - DUN
24	1xRTT Data Throttling	3.12.6 1xRTT IP Related Throttling Cleared by a Successful OTAPA Session - DUN

Automatic Embedded Apps:

Test Suites #1

Data Session Throttling Test Case Specification-1.0.0 - 1xRTT Automatic Test Cases Only		
Test #	Test Name	Test Description
1	1xRTT Data Throttling	3.1 1xRTT Paging Channel Failure: Intercept Order Message - Automatic
2	1xRTT Data Throttling	3.2 1xRTT Paging Channel Failure: Release Order with ORDQ=2 (Service Option Rejected) on the Paging Channel - Automatic
3	1xRTT Data Throttling	3.3 1xRTT Paging Channel Throttling Cancelled by 1xRTT Subnet Change - Automatic
4	1xRTT Data Throttling	3.4.2 1xRTT Paging Channel Throttling Cancelled by a Power Cycle - Automatic
5	1xRTT Data Throttling	3.4.3 1xRTT Paging Channel Throttling Cancelled by a Soft Reset - Automatic
6	1xRTT Data Throttling	3.4.4 1xRTT Paging Channel Throttling Cancelled by a Successful OTASP Session - Automatic
7	1xRTT Data Throttling	3.4.5 1xRTT Paging Channel Throttling Cancelled by a Successful OTAPA Session - Automatic
8	1xRTT Data Throttling	3.5 1xRTT Traffic Channel Failure: Release Order with ORDQ=2 (Service Option Rejected) on the Traffic Channel - Automatic
9	1xRTT Data Throttling	3.6.3 1xRT Traffic Channel Throttling Cleared by a Power Cycle - Automatic
10	1xRTT Data Throttling	3.6.4 1xRT Traffic Channel Throttling Cleared by a Soft Reset - Automatic
11	1xRTT Data Throttling	3.6.5 1xRT Traffic Channel Throttling Cleared by a Successful OTASP Session - Automatic

Data Session Throttling Test Case Specification-1.0.0 - 1xRTT Automatic Test Cases Only		
12	1xRTT Data Throttling	3.6.6 1xRT Traffic Channel Throttling Cleared by a Successful OTAPA Session - Automatic
13	1xRTT Data Throttling	3.6.8 1xRT Traffic Channel Throttling Cleared by an IMSI Change - Automatic
14	1xRTT Data Throttling	3.6.9 1xRT Traffic Channel Throttling Cleared by a MIN Change - Automatic
15	1xRTT Data Throttling	3.6.10 1xRT Traffic Channel Throttling Cleared by a MDN Change - Automatic
16	1xRTT Data Throttling	3.7 1xRTT IP Related Failure: AAA Authentication Failure – Automatic
17	1xRTT Data Throttling	3.8 1xRTT IP Related Failure: LCP Setup Failure during PPP Negotiation - Automatic
18	1xRTT Data Throttling	3.9 1xRTT IP Related Failure: IPCP Setup Failure during PPP Negotiation - Automatic
19	1xRTT Data Throttling	3.10 1xRTT IP Related Failure: MIP Agent Advertisement Failure - Automatic
20	1xRTT Data Throttling	3.11 1xRTT IP Related Failure: MIP RRQ Failure - Automatic
21	1xRTT Data Throttling	3.12.3 1xRTT IP Related Throttling Cleared by a Power Cycle - Automatic
22	1xRTT Data Throttling	3.12.4 1xRTT IP Related Throttling Cleared by a Soft Reset – Automatic
23	1xRTT Data Throttling	3.12.5 1xRTT IP Related Throttling Cleared by a Successful OTASP Session - Automatic
24	1xRTT Data Throttling	3.12.6 1xRTT IP Related Throttling Cleared by a Successful OTAPA Session - Automatic

Manual Embedded Apps:

Test Suites #1

Data Session Throttling Test Case Specification-1.0.0 - 1xRTT Manual Test Cases Only		
Test #	Test Name	Test Description
1	1xRTT Data Throttling	3.1 1xRTT Paging Channel Failure: Intercept Order Message - Brew
2	1xRTT Data Throttling	3.1 1xRTT Paging Channel Failure: Intercept Order Message - WAP
3	1xRTT Data Throttling	3.1 1xRTT Paging Channel Failure: Intercept Order Message - MMS
4	1xRTT Data Throttling	3.2 1xRTT Paging Channel Failure: Release Order with ORDQ=2 (Service Option Rejected) on the Paging Channel - Brew

Data Session Throttling Test Case Specification-1.0.0 - 1xRTT Manual Test Cases Only		
5	1xRTT Data Throttling	3.2 1xRTT Paging Channel Failure: Release Order with ORDQ=2 (Service Option Rejected) on the Paging Channel - WAP
6	1xRTT Data Throttling	3.2 1xRTT Paging Channel Failure: Release Order with ORDQ=2 (Service Option Rejected) on the Paging Channel - MMS
7	1xRTT Data Throttling	3.3 1xRTT Paging Channel Throttling Cancelled by 1xRTT Subnet Change - Brew
8	1xRTT Data Throttling	3.3 1xRTT Paging Channel Throttling Cancelled by 1xRTT Subnet Change - WAP
9	1xRTT Data Throttling	3.3 1xRTT Paging Channel Throttling Cancelled by 1xRTT Subnet Change - MMS
10	1xRTT Data Throttling	3.4.2 1xRTT Paging Channel Throttling Cancelled by a Power Cycle - Brew
11	1xRTT Data Throttling	3.4.2 1xRTT Paging Channel Throttling Cancelled by a Power Cycle - WAP
12	1xRTT Data Throttling	3.4.2 1xRTT Paging Channel Throttling Cancelled by a Power Cycle - MMS
13	1xRTT Data Throttling	3.4.3 1xRTT Paging Channel Throttling Cancelled by a Soft Reset - Brew
14	1xRTT Data Throttling	3.4.3 1xRTT Paging Channel Throttling Cancelled by a Soft Reset - WAP
15	1xRTT Data Throttling	3.4.3 1xRTT Paging Channel Throttling Cancelled by a Soft Reset - MMS
16	1xRTT Data Throttling	3.4.4 1xRTT Paging Channel Throttling Cancelled by a Successful OTASP Session - Brew
17	1xRTT Data Throttling	3.4.4 1xRTT Paging Channel Throttling Cancelled by a Successful OTASP Session - WAP
18	1xRTT Data Throttling	3.4.4 1xRTT Paging Channel Throttling Cancelled by a Successful OTASP Session - MMS
19	1xRTT Data Throttling	3.4.5 1xRTT Paging Channel Throttling Cancelled by a Successful OTAPA Session - Brew
20	1xRTT Data Throttling	3.4.5 1xRTT Paging Channel Throttling Cancelled by a Successful OTAPA Session - WAP
21	1xRTT Data Throttling	3.4.5 1xRTT Paging Channel Throttling Cancelled by a Successful OTAPA Session - MMS
22	1xRTT Data Throttling	3.5 1xRTT Traffic Channel Failure: Release Order with ORDQ=2 (Service Option Rejected) on the Traffic Channel - Brew
23	1xRTT Data Throttling	3.5 1xRTT Traffic Channel Failure: Release Order with ORDQ=2 (Service Option Rejected) on the Traffic Channel - WAP

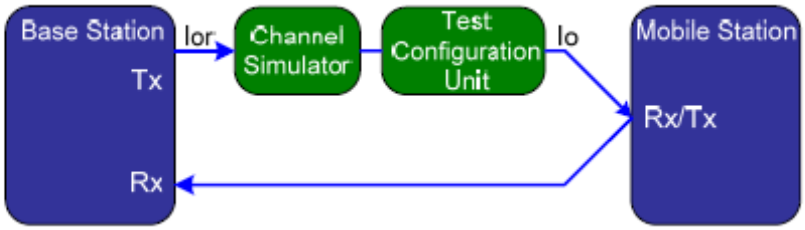
Data Session Throttling Test Case Specification-1.0.0 - 1xRTT Manual Test Cases Only		
24	1xRTT Data Throttling	3.5 1xRTT Traffic Channel Failure: Release Order with ORDQ=2 (Service Option Rejected) on the Traffic Channel - MMS
25	1xRTT Data Throttling	3.6.3 1xRT Traffic Channel Throttling Cleared by a Power Cycle - Brew
26	1xRTT Data Throttling	3.6.3 1xRT Traffic Channel Throttling Cleared by a Power Cycle - WAP
27	1xRTT Data Throttling	3.6.3 1xRT Traffic Channel Throttling Cleared by a Power Cycle - MMS
28	1xRTT Data Throttling	3.6.4 1xRT Traffic Channel Throttling Cleared by a Soft Reset - Brew
29	1xRTT Data Throttling	3.6.4 1xRT Traffic Channel Throttling Cleared by a Soft Reset - WAP
30	1xRTT Data Throttling	3.6.4 1xRT Traffic Channel Throttling Cleared by a Soft Reset - MMS
31	1xRTT Data Throttling	3.6.5 1xRT Traffic Channel Throttling Cleared by a Successful OTASP Session - Brew
32	1xRTT Data Throttling	3.6.5 1xRT Traffic Channel Throttling Cleared by a Successful OTASP Session - WAP
33	1xRTT Data Throttling	3.6.5 1xRT Traffic Channel Throttling Cleared by a Successful OTASP Session - MMS
34	1xRTT Data Throttling	3.6.6 1xRT Traffic Channel Throttling Cleared by a Successful OTAPA Session - Brew
35	1xRTT Data Throttling	3.6.6 1xRT Traffic Channel Throttling Cleared by a Successful OTAPA Session - WAP
36	1xRTT Data Throttling	3.6.6 1xRT Traffic Channel Throttling Cleared by a Successful OTAPA Session - MMS
37	1xRTT Data Throttling	3.6.8 1xRT Traffic Channel Throttling Cleared by an IMSI Change - Brew
38	1xRTT Data Throttling	3.6.8 1xRT Traffic Channel Throttling Cleared by an IMSI Change - WAP
39	1xRTT Data Throttling	3.6.8 1xRT Traffic Channel Throttling Cleared by an IMSI Change - MMS
40	1xRTT Data Throttling	3.6.9 1xRT Traffic Channel Throttling Cleared by a MIN Change - Brew
41	1xRTT Data Throttling	3.6.9 1xRT Traffic Channel Throttling Cleared by a MIN Change - WAP
42	1xRTT Data Throttling	3.6.9 1xRT Traffic Channel Throttling Cleared by a MIN Change - MMS
43	1xRTT Data Throttling	3.6.10 1xRT Traffic Channel Throttling Cleared by a MDN Change - Brew
44	1xRTT Data Throttling	3.6.10 1xRT Traffic Channel Throttling Cleared by a MDN Change - WAP

Data Session Throttling Test Case Specification-1.0.0 - 1xRTT Manual Test Cases Only		
45	1xRTT Data Throttling	3.6.10 1xRT Traffic Channel Throttling Cleared by a MDN Change - MMS
46	1xRTT Data Throttling	3.7 1xRTT IP Related Failure: AAA Authentication Failure – Brew
47	1xRTT Data Throttling	3.7 1xRTT IP Related Failure: AAA Authentication Failure – WAP
48	1xRTT Data Throttling	3.7 1xRTT IP Related Failure: AAA Authentication Failure – MMS
49	1xRTT Data Throttling	3.8 1xRTT IP Related Failure: LCP Setup Failure during PPP Negotiation - Brew
50	1xRTT Data Throttling	3.8 1xRTT IP Related Failure: LCP Setup Failure during PPP Negotiation - WAP
51	1xRTT Data Throttling	3.8 1xRTT IP Related Failure: LCP Setup Failure during PPP Negotiation - MMS
52	1xRTT Data Throttling	3.9 1xRTT IP Related Failure: IPCP Setup Failure during PPP Negotiation - Brew
53	1xRTT Data Throttling	3.9 1xRTT IP Related Failure: IPCP Setup Failure during PPP Negotiation - WAP
54	1xRTT Data Throttling	3.9 1xRTT IP Related Failure: IPCP Setup Failure during PPP Negotiation - MMS
55	1xRTT Data Throttling	3.10 1xRTT IP Related Failure: MIP Agent Advertisement Failure - Brew
56	1xRTT Data Throttling	3.10 1xRTT IP Related Failure: MIP Agent Advertisement Failure - WAP
57	1xRTT Data Throttling	3.10 1xRTT IP Related Failure: MIP Agent Advertisement Failure - MMS
58	1xRTT Data Throttling	3.11 1xRTT IP Related Failure: MIP RRQ Failure - Brew
59	1xRTT Data Throttling	3.11 1xRTT IP Related Failure: MIP RRQ Failure - WAP
60	1xRTT Data Throttling	3.11 1xRTT IP Related Failure: MIP RRQ Failure - MMS
61	1xRTT Data Throttling	3.12.3 1xRTT IP Related Throttling Cleared by a Power Cycle - Brew
62	1xRTT Data Throttling	3.12.3 1xRTT IP Related Throttling Cleared by a Power Cycle - WAP
63	1xRTT Data Throttling	3.12.3 1xRTT IP Related Throttling Cleared by a Power Cycle - MMS
64	1xRTT Data Throttling	3.12.4 1xRTT IP Related Throttling Cleared by a Soft Reset – Brew
65	1xRTT Data Throttling	3.12.4 1xRTT IP Related Throttling Cleared by a Soft Reset – WAP
66	1xRTT Data Throttling	3.12.4 1xRTT IP Related Throttling Cleared by a Soft Reset – MMS
67	1xRTT Data Throttling	3.12.5 1xRTT IP Related Throttling Cleared by a Successful OTASP Session - Brew

Data Session Throttling Test Case Specification-1.0.0 - 1xRTT Manual Test Cases Only		
68	1xRTT Data Throttling	3.12.5 1xRTT IP Related Throttling Cleared by a Successful OTASP Session - WAP
69	1xRTT Data Throttling	3.12.5 1xRTT IP Related Throttling Cleared by a Successful OTASP Session - MMS
70	1xRTT Data Throttling	3.12.6 1xRTT IP Related Throttling Cleared by a Successful OTAPA Session - Brew
71	1xRTT Data Throttling	3.12.6 1xRTT IP Related Throttling Cleared by a Successful OTAPA Session - WAP
72	1xRTT Data Throttling	3.12.6 1xRTT IP Related Throttling Cleared by a Successful OTAPA Session - MMS

2.11.EV-DO Data Throttling Test Cases

2.11.1. Hardware Configuration



NOTE: The Channel Simulator is optional for this test.

2.11.2. Description

- 4.1 1xEV-DO Traffic Channel Failure: Connection Deny (General Failure) – This test case verifies that the throttling functionality on a 1xEV-DO only system and the network responds to a Connection Request Message on the Access Channel by sending a 1xEV-DO Connection Deny message on the Control Channel with the reason code set to “General Failure”. This test also verifies that the throttling behavior is cleared by a successful call completion.
- 4.2 1xEV-DO Traffic Channel Failure: Connection Deny (Network Busy) – This test case verifies that the throttling functionality on a 1xEV-DO only system and the network responds to a Connection Request Message on the Access Channel by sending a 1xEV-DO Connection Deny message on the Control Channel with the reason code set to “Network Busy”. This test also verifies that the throttling behavior is cleared by a successful call completion.

- 4.3 1xEV-DO Traffic Channel Failure: Connection Deny (Authentication Failure) – This test case verifies that the throttling functionality on a 1xEV-DO only system and the network responds to a Connection Request Message on the Access Channel by sending a 1xEV-DO Connection Deny message on the Control Channel with the reason code set to "Authentication Failure". This test also verifies that the throttling behavior is cleared by a successful call completion.
- 4.4.3 1xEV-DO Traffic Channel Failure: Throttling Cleared by a Power Cycle – This test case verifies that the throttling behavior is cleared by the "Power Cycle" clearing events. This test case uses the throttling event of a CDMA Connection Deny message.
- 4.4.4 1xEV-DO Traffic Channel Failure: Throttling Cleared by Soft Reset – This test case verifies that the throttling behavior is cleared by the "Power Cycle" clearing events. This test case uses the throttling event of a CDMA Connection Deny message.
- 4.4.5 1xEV-DO Traffic Channel Failure: Throttling Cleared by OTASP – This test case verifies that the throttling behavior is cleared by the "Power Cycle" clearing events. This test case uses the throttling event of a CDMA Connection Deny message.
- 4.4.6 1xEV-DO Traffic Channel Failure: Throttling Cleared by OTAPA – This test case verifies that the throttling behavior is cleared by the "Power Cycle" clearing events. This test case uses the throttling event of a CDMA Connection Deny message.
- 4.5 1xEV-DO IP Related Failure: Authentication Failure – This test case verifies a device's throttling behavior when the device attempts a 1xEV-DO data session and the Access Network (AN) responds with authentication failure on the service stream. This test also verifies that the throttling behavior is cleared by a successful call completion.
- 4.6 1xEV-DO IP Related Failure: LCP Setup Failure – This test case verifies a device's throttling behavior when the device attempts a 1xEV-DO data session and encounters an LCP setup failure on the service stream. This test also verifies that the throttling behavior is cleared by a successful call completion.
- 4.7 1xEV-DO IP Related Failure: IPCP Setup Failure – This test case verifies a device's throttling behavior when the device attempts a 1xEV-DO data session and encounters an IPCP setup failure on the service stream. This test also verifies that the throttling behavior is cleared by a successful call completion.
- 4.8 1xEV-DO IP Related Failure: MIP Agent Solicitation Failure – This test verifies throttling functionality on an EV-DO-only system and the device is unable to establish a data session with the network due to a MIP Agent Solicitation Request Failure. This test also verifies that the throttling behavior is cleared by a successful call completion.
- 4.9 1xEV-DO IP Related Failure: MIP RRQ Failure – This test verifies throttling on a 1xEV-DO only system and the device is unable to establish a data session with the network due to no response from the network when the device sends a MIP Registration Request (RRQ). This test also verifies that the throttling behavior is cleared by a successful call completion.
- 4.10.2 1xEV-DO IP Related Failure: Throttling Cleared by a Power Cycle – This test case verifies that the throttling behavior is cleared by the "Power Cycle" clearing events. This test case uses the throttling event of AAA Authentication Failure.

- 4.10.3 1xEV-DO IP Related Failure: Throttling Cleared by Soft Reset – This test case verifies that the throttling behavior is cleared by the "Soft Reset" clearing events. This test case uses the throttling event of AAA Authentication Failure.

2.11.3. Test Parameters

Test Parameters	
General Parameters	• Title • Description
Application Parameters	• Data Call Initiator • 1x RTT RAN Failure • ORDQ • 1xEV RAN Failure • Reason • AAA Failure • HA Failure • HA Error Code • FA Failure • FA Error Code • PDSN Failure • Test Duration Unit • Test Duration (Steps) • Test Duration (Min) • Method to Clear Throttling • OTAPA Dial Number • MDN/IMSI/MIN Change Method • Retry Wait Window (Secs)
Network Parameters	• IP Negotiation Type

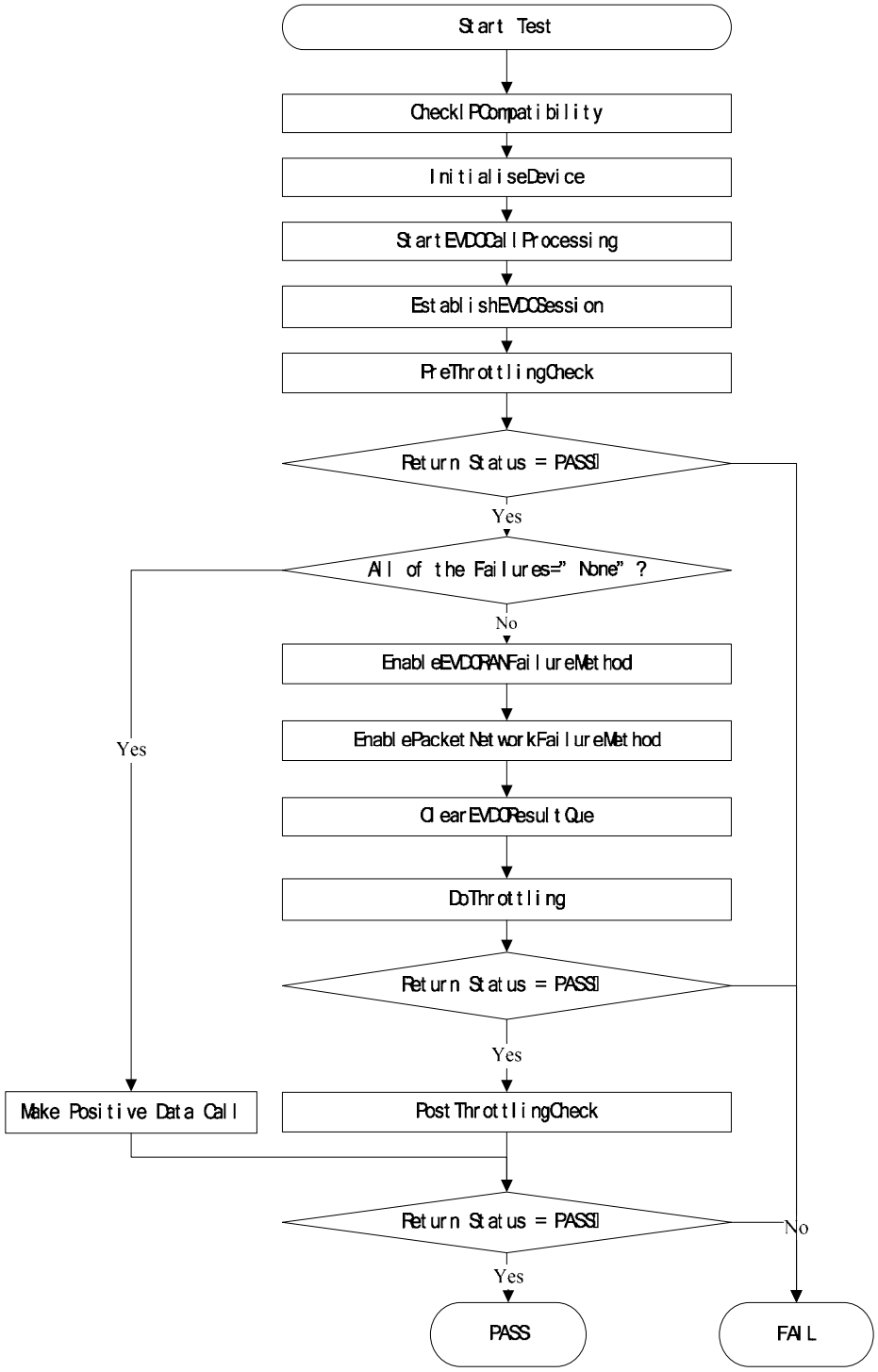
2.11.4. Test Results

The following test results are supported for this test:

- Positive Data Call Status
- Throttling Check Status
- Post-Throttling Check Status

2.11.5. Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.11.6. Spirent Sample Test Suites – EV-DO Data Throttling

DUN Applications

Test Suites #1

Data Session Throttling Test Case Specification-1.0.0 - 1xEV DUN Test Cases Only		
Test #	Test Name	Test Description
1	1xEV Data Throttling	4.1 1xEV-DO Traffic Channel Failure: ConnectionDeny Received, General Failure - DUN
2	1xEV Data Throttling	4.2 EV-DO Traffic Channel Failure: ConnectionDeny Received, Network Busy - DUN
3	1xEV Data Throttling	4.3 EV-DO Traffic Channel Failure: ConnectionDeny Received, Authentication Failure - DUN
4	1xEV Data Throttling	4.4.3 EV-DO Traffic Channel Throttling Cleared by a Power Cycle - DUN
5	1xEV Data Throttling	4.4.4 EV-DO Traffic Channel Throttling Cleared by a Soft Reset - DUN
6	1xEV Data Throttling	4.4.5 EV-DO Traffic Channel Throttling Cleared by a Successful OTASP Session - DUN
7	1xEV Data Throttling	4.4.6 EV-DO Traffic Channel Throttling Cleared by a Successful OTAPA Session - DUN
8	1xEV Data Throttling	4.5 1xEV-DO IP Related Failures: Authentication Failure - DUN
9	1xEV Data Throttling	4.6 1xEV-DO IP Related Failures: LCP Setup Failure during PPP Negotiation - DUN
10	1xEV Data Throttling	4.7 1xEV-DO IP Related Failures: IPCP Setup Failure during PPP Negotiation - DUN
11	1xEV Data Throttling	4.8 1xEV-DO IP Related Failures: MIP Agent Advertisement Failure - DUN
12	1xEV Data Throttling	4.9 1xEV-DO IP Related Failures: MIP RRQ Failure - DUN
13	1xEV Data Throttling	4.10.2 1xEV-DO IP Related Throttling Cleared by a Power Cycle - DUN
14	1xEV Data Throttling	4.10.3 1xEV-DO IP Related Throttling Cleared by a Soft Reset - DUN

Automatic Embedded Applications

Test Suites #1

Data Session Throttling Test Case Specification-1.0.0 - 1xEV Automatic Test Cases Only		
Test #	**Test Name**	**Test Description**
1	1xEV Data Throttling	4.1 1xEV-DO Traffic Channel Failure: ConnectionDeny Received, General Failure - Automatic
2	1xEV Data Throttling	4.2 EV-DO Traffic Channel Failure: ConnectionDeny Received, Network Busy - Automatic
3	1xEV Data Throttling	4.3 EV-DO Traffic Channel Failure: ConnectionDeny Received, Authentication Failure - Automatic
4	1xEV Data Throttling	4.4.3 EV-DO Traffic Channel Throttling Cleared by a Power Cycle - Automatic
5	1xEV Data Throttling	4.4.4 EV-DO Traffic Channel Throttling Cleared by a Soft Reset - Automatic
6	1xEV Data Throttling	4.4.5 EV-DO Traffic Channel Throttling Cleared by a Successful OTASP Session - Automatic
7	1xEV Data Throttling	4.4.6 EV-DO Traffic Channel Throttling Cleared by a Successful OTAPA Session - Automatic
8	1xEV Data Throttling	4.5 1xEV-DO IP Related Failures: Authentication Failure - Automatic
9	1xEV Data Throttling	4.6 1xEV-DO IP Related Failures: LCP Setup Failure during PPP Negotiation - Automatic
10	1xEV Data Throttling	4.7 1xEV-DO IP Related Failures: IPCP Setup Failure during PPP Negotiation - Automatic
11	1xEV Data Throttling	4.8 1xEV-DO IP Related Failures: MIP Agent Advertisement Failure - Automatic
12	1xEV Data Throttling	4.9 1xEV-DO IP Related Failures: MIP RRQ Failure - Automatic
13	1xEV Data Throttling	4.10.2 1xEV-DO IP Related Throttling Cleared by a Power Cycle - Automatic
14	1xEV Data Throttling	4.10.3 1xEV-DO IP Related Throttling Cleared by a Soft Reset - Automatic

Manual Embedded Applications

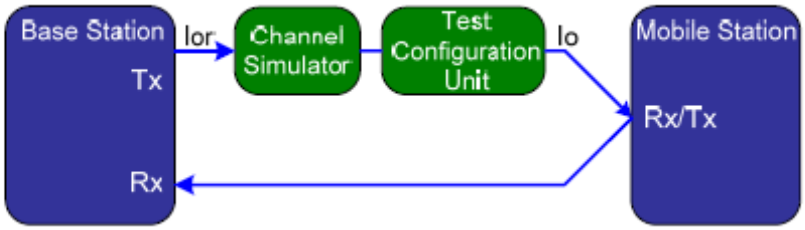
Test Suites #1

Data Session Throttling Test Case Specification-1.0.0 - 1xEV Manual Test Cases Only		
Test #	Test Name	Test Description
1	1xEV Data Throttling	4.1 1xEV-DO Traffic Channel Failure: ConnectionDeny Received, General Failure - Brew
2	1xEV Data Throttling	4.1 1xEV-DO Traffic Channel Failure: ConnectionDeny Received, General Failure - WAP
3	1xEV Data Throttling	4.1 1xEV-DO Traffic Channel Failure: ConnectionDeny Received, General Failure - MMS
4	1xEV Data Throttling	4.2 EV-DO Traffic Channel Failure: ConnectionDeny Received, Network Busy - Brew
5	1xEV Data Throttling	4.2 EV-DO Traffic Channel Failure: ConnectionDeny Received, Network Busy - WAP
6	1xEV Data Throttling	4.2 EV-DO Traffic Channel Failure: ConnectionDeny Received, Network Busy - MMS
7	1xEV Data Throttling	4.3 EV-DO Traffic Channel Failure: ConnectionDeny Received, Authentication Failure - Brew
8	1xEV Data Throttling	4.3 EV-DO Traffic Channel Failure: ConnectionDeny Received, Authentication Failure - WAP
9	1xEV Data Throttling	4.3 EV-DO Traffic Channel Failure: ConnectionDeny Received, Authentication Failure - MMS
10	1xEV Data Throttling	4.4.3 EV-DO Traffic Channel Throttling Cleared by a Power Cycle - Brew
11	1xEV Data Throttling	4.4.3 EV-DO Traffic Channel Throttling Cleared by a Power Cycle - WAP
12	1xEV Data Throttling	4.4.3 EV-DO Traffic Channel Throttling Cleared by a Power Cycle - MMS
13	1xEV Data Throttling	4.4.4 EV-DO Traffic Channel Throttling Cleared by a Soft Reset - Brew
14	1xEV Data Throttling	4.4.4 EV-DO Traffic Channel Throttling Cleared by a Soft Reset - WAP
15	1xEV Data Throttling	4.4.4 EV-DO Traffic Channel Throttling Cleared by a Soft Reset - MMS
16	1xEV Data Throttling	4.4.5 EV-DO Traffic Channel Throttling Cleared by a Successful OTASP Session - Brew
17	1xEV Data Throttling	4.4.5 EV-DO Traffic Channel Throttling Cleared by a Successful OTASP Session - WAP
18	1xEV Data Throttling	4.4.5 EV-DO Traffic Channel Throttling Cleared by a Successful OTASP Session - MMS
19	1xEV Data Throttling	4.4.6 EV-DO Traffic Channel Throttling Cleared by a Successful OTAPA Session - Brew

Data Session Throttling Test Case Specification-1.0.0 - 1xEV Manual Test Cases Only		
20	1xEV Data Throttling	4.4.6 EV-DO Traffic Channel Throttling Cleared by a Successful OTAPA Session - WAP
21	1xEV Data Throttling	4.4.6 EV-DO Traffic Channel Throttling Cleared by a Successful OTAPA Session - MMS
22	1xEV Data Throttling	4.5 1xEV-DO IP Related Failures: Authentication Failure - Brew
23	1xEV Data Throttling	4.5 1xEV-DO IP Related Failures: Authentication Failure - WAP
24	1xEV Data Throttling	4.5 1xEV-DO IP Related Failures: Authentication Failure - MMS
25	1xEV Data Throttling	4.6 1xEV-DO IP Related Failures: LCP Setup Failure during PPP Negotiation - Brew
26	1xEV Data Throttling	4.6 1xEV-DO IP Related Failures: LCP Setup Failure during PPP Negotiation - WAP
27	1xEV Data Throttling	4.6 1xEV-DO IP Related Failures: LCP Setup Failure during PPP Negotiation - MMS
28	1xEV Data Throttling	4.7 1xEV-DO IP Related Failures: IPCP Setup Failure during PPP Negotiation - Brew
29	1xEV Data Throttling	4.7 1xEV-DO IP Related Failures: IPCP Setup Failure during PPP Negotiation - WAP
30	1xEV Data Throttling	4.7 1xEV-DO IP Related Failures: IPCP Setup Failure during PPP Negotiation - MMS
31	1xEV Data Throttling	4.8 1xEV-DO IP Related Failures: MIP Agent Advertisement Failure - Brew
32	1xEV Data Throttling	4.8 1xEV-DO IP Related Failures: MIP Agent Advertisement Failure - WAP
33	1xEV Data Throttling	4.8 1xEV-DO IP Related Failures: MIP Agent Advertisement Failure - MMS
34	1xEV Data Throttling	4.9 1xEV-DO IP Related Failures: MIP RRQ Failure - Brew
35	1xEV Data Throttling	4.9 1xEV-DO IP Related Failures: MIP RRQ Failure - WAP
36	1xEV Data Throttling	4.9 1xEV-DO IP Related Failures: MIP RRQ Failure - MMS
37	1xEV Data Throttling	4.10.2 1xEV-DO IP Related Throttling Cleared by a Power Cycle - Brew
38	1xEV Data Throttling	4.10.2 1xEV-DO IP Related Throttling Cleared by a Power Cycle - WAP
39	1xEV Data Throttling	4.10.2 1xEV-DO IP Related Throttling Cleared by a Power Cycle - MMS
40	1xEV Data Throttling	4.10.3 1xEV-DO IP Related Throttling Cleared by a Soft Reset - Brew
41	1xEV Data Throttling	4.10.3 1xEV-DO IP Related Throttling Cleared by a Soft Reset - WAP
42	1xEV Data Throttling	4.10.3 1xEV-DO IP Related Throttling Cleared by a Soft Reset - MMS

2.12.Hybrid Mode Data Throttling Test Cases

2.12.1. Hardware Configuration



NOTE: The Channel Simulator is optional for this test.

2.12.2. Description

- 5.1 Multi-System IP Related Failure: AAA Authentication Failure – This test case verifies that the device throttles 1xEV-DO and 1xRTT systems independently.
- 5.5.2 Multi-System IP Related Failure: Throttling Cleared by OTASP – This test case verifies that the throttling behavior is cleared by the "OTASP Call" clearing events. This test case uses the throttling event of AAA Authentication Failure.
- 5.5.3 Multi-System IP Related Failure: Throttling Cleared by OTAPA – This test case verifies that the throttling behavior is cleared by the "OTAPA Call" clearing events. This test case uses the throttling event of AAA Authentication Failure.

2.12.3. Test Parameters

Test Parameters	
General Parameters	• Title • Description
Application Parameters	• Data Call Initiator • 1x RTT RAN Failure • ORDQ • 1xEV RAN Failure • Reason • AAA Failure • HA Failure • HA Error Code • FA Failure • FA Error Code • PDSN Failure

Test Parameters	
	• Test Duration Unit • Test Duration (Steps) • Test Duration (Min) • Method to Clear Throttling • OTAPA Dial Number • MDN/IMSI/MIN Change Method • Retry Wait Window (Secs)
Network Parameters	• IP Negotiation Type

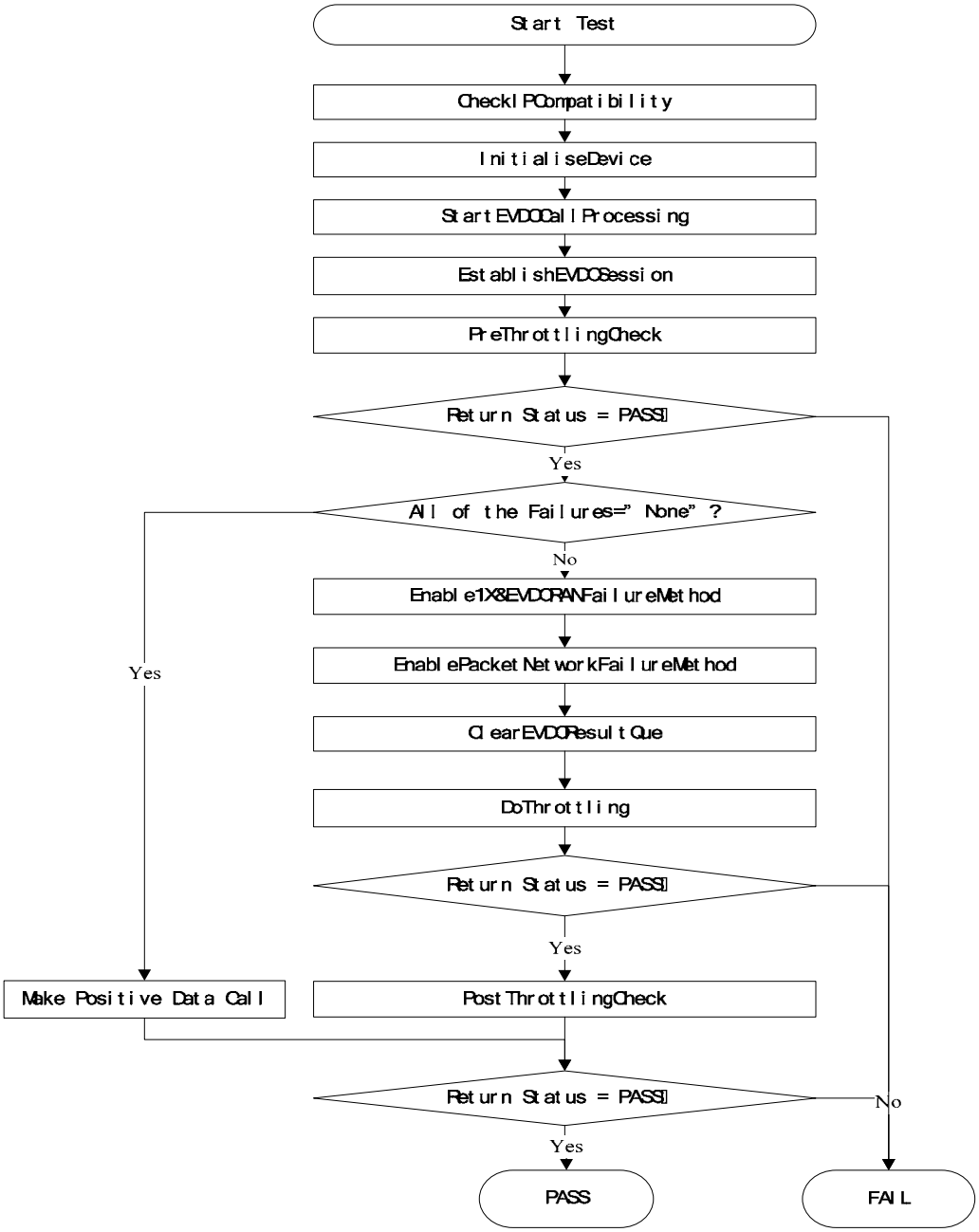
2.12.4. Test Results

The following test results are supported for this test:

- Positive Data Call Status
- Throttling Check Status
- Post-Throttling Check Status

2.12.5. Test Algorithm

The following flowchart details the actions and measurements taken during test execution.



2.12.6. Spirent Sample Test Suites – Hybrid Mode Data Throttling

DUN Applications

Test Suites #1.

Data Session Throttling Test Case Specification-1.0.0 Hybrid Mode DUN Test Cases Only		
Test #	Test Name	Test Description
1	Hybrid Mode Data Throttling	5.1 Multi-system AAA Authentication failure - DUN
2	Hybrid Mode Data Throttling	5.5.2 Multi-system IP Related Throttling Cleared by a Successful OTASP Session - DUN
3	Hybrid Mode Data Throttling	5.5.3 Multi-system IP Related Throttling Cleared by a Successful OTAPA Session - DUN

Automatic Embedded Apps:

Test Suites #1

Data Session Throttling Test Case Specification-1.0.0 Hybrid Mode Automatic Test Cases Only		
Test #	Test Name	Test Description
1	Hybrid Mode Data Throttling	5.1 Multi-system AAA Authentication failure - Automatic
2	Hybrid Mode Data Throttling	5.5.2 Multi-system IP Related Throttling Cleared by a Successful OTASP Session - Automatic
3	Hybrid Mode Data Throttling	5.5.3 Multi-system IP Related Throttling Cleared by a Successful OTAPA Session - Automatic

Manual Embedded Apps:

Test Suites #1

Data Session Throttling Test Case Specification-1.0.0 Hybrid Mode Manual Test Cases Only		
Test #	**Test Name**	**Test Description**
1	Hybrid Mode Data Throttling	5.1 Multi-system AAA Authentication failure - Brew
2	Hybrid Mode Data Throttling	5.1 Multi-system AAA Authentication failure - WAP
3	Hybrid Mode Data Throttling	5.1 Multi-system AAA Authentication failure - MMS
4	Hybrid Mode Data Throttling	5.5.2 Multi-system IP Related Throttling Cleared by a Successful OTASP Session - Brew
5	Hybrid Mode Data Throttling	5.5.2 Multi-system IP Related Throttling Cleared by a Successful OTASP Session - WAP
6	Hybrid Mode Data Throttling	5.5.2 Multi-system IP Related Throttling Cleared by a Successful OTASP Session - MMS
7	Hybrid Mode Data Throttling	5.5.3 Multi-system IP Related Throttling Cleared by a Successful OTAPA Session - Brew
8	Hybrid Mode Data Throttling	5.5.3 Multi-system IP Related Throttling Cleared by a Successful OTAPA Session - WAP
9	Hybrid Mode Data Throttling	5.5.3 Multi-system IP Related Throttling Cleared by a Successful OTAPA Session - MMS

2.13.Description of Common Test Parameters

2.13.1. General Parameters

Applies To Slot Cycle Index This parameter determines whether the selected test will be performed based on the SCI in the mobile file. If this parameter value matches the SCI value in the mobile file, then the test will be executed.
Description This parameter is a test field that allows you to label the test with a description.
Loop On Channel This parameter determines whether the selected test will be performed for each selected (checked) PRL entry in the mobile file. When it is set to "On," Spirent Data will loop through the selected test multiple times, one for each PRL entry.
Title Title is the type of test that is selected. This is chosen by clicking on the left most column of the suite grid. This specifies the type of test to be run.

2.13.2. Levels

Ior (dBm/1.23 MHz) This field sets the composite downlink sector power level that the mobile device will receive. For most tests this is a settable parameter.
Sector 1 Ior (dBm/1.23 MHz) This field sets the composite downlink sector power level that the mobile device will receive on Sector 1 for tests that use 2 Sectors. For most tests this is a settable parameter.
Sector 2 Ior (dBm/1.23 MHz) This field sets the composite downlink sector power level that the mobile device will receive on Sector 2 for tests that use 2 Sectors. For most tests this is a settable parameter.

2.13.3. AirAccess Data Parameters

Forward Data Rate Multiplier This field sets the Forward Data Rate Multiplier of the F-SCH (e.g. 2X data rate = 2 x 9600 bps). Spirent Data will configure the Network Emulator with the corresponding MUX Option for service negotiation. If F-SCH should not be used during the test, select "No SCH."
Forward SCH Coding This field sets the coding scheme to be used on the F-SCH during the test execution. When "Convolutional/Turbo" coding is selected, Spirent Data will configure the Network Emulator to use the Convolution/Turbo coding scheme based on the selected data rate as specified in the IS-2000 specification.

Reverse Data Rate Multiplier This field sets the Reverse Data Rate Multiplier of the R-SCH (e.g. 2X data rate = 2 x 9600bps). Spirent Data will configure the Network Emulator with the corresponding MUX Option for service negotiation. If R-SCH should not be used during the test, select "No SCH."
Reverse SCH Coding This field sets the coding scheme to be used on the R-SCH during the test execution. When "Convolutional/Turbo" coding is selected, Spirent Data will configure the Network Emulator to use the Convolution/Turbo coding scheme based on the selected data rate as specified in the IS-2000 specification.
RLP Frame Type This field sets the RLP Frame Type to be used on the F-FCH during the test execution.

2.13.4. File Transfer Parameters

Download Filename This field specifies the file to transfer when a download is requested. Files requested for download must be stored in C:\inetpub\ftproot\Spirent\APEX-FTP\Download directory for FTP; in C:\inetpub\wwwroot\Spirent\APEX-HTTP\Download directory for HTTP.
Number of File Transfers This field determines the number of times to perform the given file transfers. All transfers are average at the end of the test.
Stress Duration (min) This field specifies the amount of time to repeat selected file transfers for. It is used in the Fixed Level Stress Test.
Transfer Direction This field determines the direction in which file transfers will occur from the perspective of the client application. Upload indicates a file transfer from the client PC to the server PC. Download indicates a file transfer from the server PC to the client PC. Bi-Direction indicates that files should be transferred in both directions simultaneously.
Transfer Protocol This field determines the protocol to use when transferring files. File transfers can be done using FTP or HTTP protocol.
Transfer X Direction This field determines the direction in which file transfers will occur for the specified number of file transfers. This parameter is taken from the perspective of the client application. Upload indicates a file transfer from the client PC to the server PC. Download indicates a file transfer from the server PC to the client PC. Bi-Directional indicates that files should be transferred in both directions simultaneously.
Transfer X Download Filename This field specifies the file to transfer when a download is requested for the specified number of file transfers. Files requested for download must be stored in C:\inetpub\ftproot\Spirent\APEX-FTP\Download directory for FTP, and in C:\inetpub\wwwroot\Spirent\APEX-HTTP\Download directory for HTTP.
Transfer X Forward Data Rate Multiplier This field sets the Forward Data Rate Multiplier of the F-SCH (e.g. 2X data rate = 2 x 9600bps) for the given number file transfer. Spirent Data will configure the Network Emulator with the corresponding MUX Option for service negotiation. If F-SCH should not be used during the test, select "No SCH."

Transfer X Ior (dBm/1.23MHz) This field sets the composite downlink sector power level that the mobile device will receive for the specified number of file transfers. It applies to the Variable Level Stress Test.
Transfer X Required Download Throughput (Kbps) This field determines the minimum throughput that is acceptable to achieve a passing result for the specified number of file transfers on the forward link.
Transfer X Required Upload Throughput (Kbps) This field determines the minimum throughput that is acceptable to achieve a passing result for the specified number of file transfers on the reverse link.
Transfer X Reverse Data Rate Multiplier This field sets the Reverse Data Rate Multiplier of the R-SCH (e.g. 2X data rate = 2 x 9600bps) for the specified number of file transfers. Spirent Data will configure the Network Emulator with the corresponding MUX Option for service negotiation. If R-SCH should not be used during the test, select "No SCH."
Transfer X Upload Filename This field specifies the file to transfer when an upload is requested for the specified number of file transfers. All files requested for upload must be stored in the Upload folder in the installation directory of the Spirent Data remote client.
Upload Filename This field specifies the file to transfer when an upload is requested. All files requested for upload must be stored in the Upload folder in the installation directory of the Spirent Data remote client.

2.13.5. Data Ping Parameters

Data Ping Duration (sec) This field specifies the amount of time to repeat sending pings. It is used in the Data Ping Round-Trip Delay test.

2.13.6. DMU Parameters

Change MN Authenticator This field is used in DMU tests. Setting this parameter to 'Yes' will prompt the you to reset the MN Authenticator in the mobile device. It is used to simulate a failure condition.
Delay AAA Auth RRP This field is used in DMU tests. Setting this parameter to 'Yes' will cause AirAccess to delay sending the AAA Auth RRP in response to the Key Payload RRQ. It is used to simulate a failure condition.
Delay Final RRP This field is used in DMU tests. Setting this parameter to 'Yes' will cause AirAccess to delay sending the Final RRP in response to the Final RRQ. It is used to simulate a failure condition.
Delay Key Update RRP This field is used in DMU tests. Setting this parameter to 'Yes' will cause AirAccess to delay sending the Key Update RRP in response to the initial RRQ. It is used to simulate a failure condition.
Mismatch MN Authenticator This field is used in DMU tests. Setting this parameter to 'Yes' will cause AirAccess to set an MN Authenticator that is different from what the mobile device is using. It is used to simulate a failure condition.

Override Private Key File This field is used in DMU tests. Setting this parameter to 'Yes' allows the test to used the Private Key File specified in the test instead of that which is specified in the mobile file.
Private Key Override Filename This field is used in DMU tests in conjunction with the 'Override Private Key File' parameter. The filename specified in this parameter will be used to override the private key file specified in the mobile file.

2.13.7. Test Criteria

Average Round-Trip Delay This field indicates the maximum allowable average round-trip time of all packets sent during the duration of the test.
Channel Setup Time (sec) This field sets the maximum time difference between the mobile station sending the first Origination Message and the mobile station receiving the first BS Ack Order Message over the F-FCH. If the measured value exceeds this amount, the test is failed.
Channel Teardown Time (sec) This field sets the maximum time difference between the Release Order sent by the mobile station and the Release Order received in response from the Base Station. If the measured value exceeds this amount, the test is failed.
Check Transfer Throughput This field indicates whether or not transfer throughput should be regarded as a pass/fail condition. If TRUE, transfer rate is compared to the required values for passing. This parameter is used in the Variable Level Stress Test.
Minimum Round-Trip Delay This field indicates the minimum allowable round-trip time of any packet sent during the duration of the test.
Maximum Round-Trip Delay This field indicates the maximum allowable round-trip time of any packet sent during the duration of the test.
Mobile IP Re-registration Time Error This field is applicable only if the Verify Mobile IP Re-registration Time parameter is set to Enabled. It specifies the expected error/variation of the Re-registration time to be expected for the mobile device under test.
Packets Lost This field indicates the maximum allowable ratio of packets lost to the packets sent.
Required Download Throughput (Kbps) This field determines the minimum throughput that is acceptable to achieve a passing result for files transfers on the forward link.
Required Upload Throughput (Kbps) This field determines the minimum throughput that is acceptable to achieve a passing result for file transfers on the reverse link.
Service Negotiation Time (sec) This field sets the maximum time difference between the mobile station sending/receiving the service negotiation message (Service Request Message/Service Connect Message) and the mobile station sending Service Connect Completion Message. If the measured value exceeds this amount, the test is failed.

Service Setup Time (sec) This field sets the maximum time difference between the mobile station sending the first Origination Message and the mobile station receiving Service Connect Message. If the measured value exceeds this amount, the test fails.
Transfer Check Criteria This field determines the procedure to use when checking pass/fail criteria for the test. Average means that the average throughput of all transfers must be higher than the required throughput in order to achieve a passing result. 'All' means that all transfers must be higher than the required throughput in order to achieve a passing result.
Verify AAA Authenticator Change This field indicates whether or not to check if the AAA Authenticator changed between subsequent DMU updates.
Verify AAA Auth RRP This field indicates whether or not the AAA Auth RRP sent by the AAA during the DMU update process will be searched for in the AirAccess message logs.
Verify Agent Advertisements This field indicates whether or not the test should check for the existence of Mobile IP agent advertisements.
Verify Data Flow This field indicates whether or not the test should verify the proper operation of the data session during an Active High Speed Packet Data call.
Verify Final RRP This field indicates whether or not the Final RRP sent by the AAA during the DMU update process will be searched for in the AirAccess message logs.
Verify Final RRQ This field indicates whether or not the Final RRQ sent by the mobile device during the DMU update process will be searched for in the AirAccess message logs.
Verify Key Change This field indicates whether or not to check if the authentication keys changed between subsequent DMU updates. This parameter only applies to multi-iteration DMU tests.
Verify Key Data RRQ This field indicates whether or not the Key Data RRQ sent by the mobile device during the DMU update process will be searched for in the AirAccess message logs.
Verify Key Update Request RRP This field indicates whether or not the Key Update Request RRP sent by the AAA during the DMU update process will be searched for in the AirAccess message logs.
Verify MN Authenticator This field indicates whether or not to check if the MN Authenticator value has changed between subsequent DMU updates. This parameter only applies to multi-iteration DMU tests.
Verify Mobile IP Registration Request Challenge This field indicates whether or not the test should check challenge value sent by the mobile device in the Mobile IP Registration Request Message during Re-registration.
Verify Mobile IP Registration Response Code This field indicates whether or not the test should check the response code value in the Mobile IP Registration Response Message that is sent by the PDSN/FA.

Verify Mobile IP Re-registration Time This field indicates whether or not the test should check the time between each Mobile IP Re-registration. The mobile device should attempt to re-register before the Registration Lifetime, decreased by the Pre-Re-registration time.
Verify Mobile Proposed Lifetime This field indicates whether or not the test should verify the Lifetime value proposed by the mobile device in the Mobile IP Registration Request Message.
Verify Mobile Registration Request This field indicates whether or not the test should check for the existence of a Mobile IP registration request during call setup.
Verify PDSN Registration Response This field indicates whether or not the test should check for the existence of a Mobile IP registration response during call setup.
Verify Post Handoff RRQ This field indicates whether or not to check the AirAccess message logs for a Mobile IP Registration Request following a successful handoff. This parameter only applies to handoff tests.
Verify PPP Traffic This field indicates whether or not the test should check the end-to-end connectivity of the Mobile IP session once call setup has completed.
Verify Registration Identification When Mobile IP registration failed, mobile device may re-send the same Mobile IP Registration Request Message with a new registration identification. This field indicates whether or not the test should check that the identification is new.

2.13.8. Multi-path

Fading State This field determines whether or not to include fading characteristics in the RF channel. If disabled, all other fading parameters will be ignored and the test will be run on a clean channel.
Path1 Delay (micro-seconds) This field determines the amount of time the signal coming through Path1 is delayed relative to the main signal.
Path1 Loss (dB) This field determines the signal loss in Path1 relative to the main signal.
Path1 State This field determines whether or not Path1 is enabled in the RF channel. This parameter is read-only since at least one path must be enabled if fading is on.
Path10 Delay (micro-seconds) This field determines the amount of time the signal coming through Path10 is delayed relative to the main signal.
Path10 Loss (dB) This field determines the signal loss in Path10 relative to the main signal.
Path10 State This field determines whether or not Path10 is enabled in the RF channel.
Path11 Delay (micro-seconds) This field determines the amount of time the signal coming through Path11 is delayed relative to the main signal.

Path11 Loss (dB) This field determines the signal loss in Path11 relative to the main signal.
Path11 State This field determines whether or not Path11 is enabled in the RF channel.
Path12 Delay (micro-seconds) This field determines the amount of time the signal coming through Path12 is delayed relative to the main signal.
Path12 Loss (dB) This field determines the signal loss in Path12 relative to the main signal.
Path12 State This field determines whether or not Path12 is enabled in the RF channel.
Path2 Delay (micro-seconds) This field determines the amount of time the signal coming through Path2 is delayed relative to the main signal.
Path2 Loss (dB) This field determines the signal loss in Path2 relative to the main signal.
Path2 State This field determines whether or not Path2 is enabled in the RF channel.
Path3 Delay (micro-seconds) This field determines the amount of time the signal coming through Path3 is delayed relative to the main signal.
Path3 Loss (dB) This field determines the signal loss in Path3 relative to the main signal.
Path3 State This field determines whether or not Path3 is enabled in the RF channel.
Path4 Delay (micro-seconds) This field determines the amount of time the signal coming through Path4 is delayed relative to the main signal.
Path4 Loss (dB) This field determines the signal loss in Path4 relative to the main signal.
Path4 State This field determines whether or not Path4 is enabled in the RF channel.
Path5 Delay (micro-seconds) This field determines the amount of time the signal coming through Path5 is delayed relative to the main signal.
Path5 Loss (dB) This field determines the signal loss in Path5 relative to the main signal.
Path5 State This field determines whether or not Path5 is enabled in the RF channel.
Path6 Delay (micro-seconds) This field determines the amount of time the signal coming through Path6 is delayed relative to the main signal.
Path6 Loss (dB) This field determines the signal loss in Path6 relative to the main signal.
Path6 State This field determines whether or not Path6 is enabled in the RF channel.

Path7 Delay (micro-seconds) This field determines the amount of time the signal coming through Path7 is delayed relative to the main signal.
Path7 Loss (dB) This field determines the signal loss in Path7 relative to the main signal.
Path7 State This field determines whether or not Path7 is enabled in the RF channel.
Path8 Delay (micro-seconds) This field determines the amount of time the signal coming through Path8 is delayed relative to the main signal.
Path8 Loss (dB) This field determines the signal loss in Path8 relative to the main signal.
Path8 State This field determines whether or not Path8 is enabled in the RF channel.
Path9 Delay (micro-seconds) This field determines the amount of time the signal coming through Path9 is delayed relative to the main signal.
Path9 Loss (dB) This field determines the signal loss in Path9 relative to the main signal.
Path9 State This field determines whether or not Path9 is enabled in the RF channel.
Velocity (km/hr) This field determines the velocity of the mobile device's motion that will be simulated in the impaired RF channel.

2.13.9. Test Details Parameters

Allow Mobile Registration Retry This field is applicable to the Registration Error test only. It determines whether the test will allow the mobile device to re-send the Mobile IP Registration Request message after the Mobile IP registration failed.
Foreign Agent Error Code This field is applicable to the Registration Error test only. It determines the FA error code that will be sent to the mobile device in the Mobile IP Registration Response message when "User defined FA error" error type is selected.
Home Agent Error Code This field is applicable to the Registration Error test only. It determines the HA error code that will be sent to the mobile device in the Mobile IP Registration Response message when "User defined HA error" error type is selected.
Mobile Dormancy Timer (sec) This parameter is applicable to the Channel Setup and Teardown Time test only when Test State is set to "Dormant <-> Active". It sets the timer in second for which Spirent Data will wait for the mobile station to transition from Active state to Dormant state.
Mobile IP Registration Error Type This field is applicable to the Registration Error test only. It determines the type of Mobile IP Registration Error is used in the test. The supported options are "MN-AAA secret mismatched," "MN-HA secret mismatched," "User defined HA error," and "User defined FA error."

Numbers of Re-registration This field is applicable to the Registration Lifetime test only. It determines the numbers of Re-Registration the test will be performed before the average Re-registration time of the mobile device is calculated.
Pre-Re-registration Timer This field is applicable to the Registration Lifetime test only. It determines the Pre-Re-Registration timer of the mobile device under test. The mobile device is to re-register before the registration lifetime, decreased by this timer value.
Test State This parameter is applicable to the Channel Setup and Teardown Time test only. It sets the data call state transition where the measurements are taken in the test. The supported options are "Idle ‹-› Active" and "Dormant ‹-› Active" field.

2.13.10.AirAccess MoIP Parameters

Agent Advertisement Count This field determines the number of agent advertisements to send when in Mobile IP mode. This parameter is only used if agent advertisements are enabled.
Agent Advertisement Enabled This field determines whether or not AirAccess should broadcast agent advertisements.
Agent Advertisement Interval This field determines the amount of time to wait before sending another agent advertisement when in Mobile IP mode. This parameter is only used if agent advertisements are enabled.
Foreign Agent Destination IP Address This field determines the destination IP address that AirAccess should send agent advertisement messages to. Allowable values are 224.0.0.1 and 255.255.255.255.
Foreign Agent Registration Lifetime This field determines the Registration Lifetime timer to be used by the PDSN/Foreign Agent during Mobile IP session.
Home Agent IP Address This field determines IP address to use for the Home Agent during a Mobile IP session.
Home Agent Registration Lifetime This field determines the Registration Lifetime timer to be used by the Home Agent during Mobile IP session.
IP Negotiation Type This field determines which type of IP negotiation to use in the test. Valid values are 'Simple IP' and 'Mobile IP'.
MN-HA Security Calculation Mode This field determines which security calculation mode to use during a Mobile IP session. Allowable values are RFC2002bis and RFC2002.
Mobile IP Address Type This field determines which type of IP address assignment is used once a Mobile IP session is established. This can be set to Static to use a static IP address for the mobile device (specified in the mobile file).

2.13.11.Handoff Parameters

Handoff State This field represents the state that the PDSN should be in when handoff occurs. Valid values are 'Active' or 'Dormant'. This parameter applies to handoff tests only.
Handoff Type This field represents the type of PDSN handoff to perform. Valid values are 'Inter-PDSN' or 'Intra-PDSN'. This parameter applies to handoff tests only.
Perform Return Handoff This field indicates whether or not the test should handoff back to its starting sector after the initial handoff. This parameter applies to handoff tests only.
Return Handoff State This field represents the state that the PDSN should be in when the return handoff occurs. Valid values are 'Active' or 'Dormant'. This parameter applies to handoff tests only.
Sector 1 PZID This field represents the Packet Zone ID value for Sector 1 in a multi-sector test. This parameter applies to handoff tests only.
Sector 2 PZID This field represents the Packet Zone ID value for Sector 2 in a multi-sector test. This parameter applies to handoff tests only.

2.14.Description of Common Test Results

2.14.1. Common Results

Band Class The band class that the mobile device is tested under.
CDMA Channel The CDMA channel number that the mobile device used for call setup and registration.
Failure Reason This result contains a descriptive reason for a failed or undetermined test status.
Start Time This is the time stamp of when the test started execution.
Status This is the status of the test: Pass, Fail, Undetermined.
StopTime This is the time stamp of when the test completed execution.

2.14.2. Channel Setup and Teardown Results

Channel Setup Time (sec) This is the measured time difference between the mobile station sending the first Origination Message and the mobile station receiving the first BS Ack Order Message over the F-FCH.
Channel Teardown Time (sec) This is the measured time difference between the Release Order sent by the mobile station and the Release Order received in response from the Base Station.
Service Negotiation Time (sec) This is the measured time difference between the mobile station sending/receiving the service negotiation message (Service Request Message/Service Connect Message) and the mobile station sending Service Connect Completion Message.
Service Setup Time (sec) This field sets the maximum time difference between the mobile station sending the first Origination Message and the mobile station receiving Service Connect Message.

2.14.3. File Transfer Results

Forward Bytes Transferred The number of bytes from the requested file that was transferred on the forward link. This does not include any bytes retransmitted or the overhead required by the transfer protocol.
Forward Link Throughput (Kbps) The overall throughput for the file transfer on the forward link. In the case of a Bi-Directional test this parameter may be truncated if the reverse link transfer completes before the forward link transfer.
Forward Link Transfer Time (sec) The total time the requested file took to be transferred from the server to the client via the RF link. In the case of a Bi-Directional test this parameter may be truncated if the reverse link transfer completes before the forward link transfer.
Reverse Bytes Transferred The number of bytes from the requested file that was transferred on the reverse link. This does not include any bytes retransmitted or the overhead required by the transfer protocol.
Reverse Link Throughput (Kbps) The overall throughput for the file transfer on the reverse link. In the case of a Bi-Directional test this parameter may be truncated if the forward link transfer completes before the reverse link transfer.
Reverse Link Transfer Time (sec) The total time the requested file took to be transferred from the client to the server via the RF link. In the case of a Bi-Directional test this parameter may be truncated if the forward link transfer completes before the reverse link transfer.

2.14.4. Fixed Level Stress Test Results

File Transfers Failed The number of file transfers that did not exceed the pass/fail criteria for throughput.
Total File Transfers The number of file transfers that occurred during the specified stress duration. Each individual transfer is counted, so a bi-direction test will have twice the number of transfers as a uni-directional test.

2.14.5. Variable Level Stress Test Results

Completed File Transfers The number of file transfers that completed successfully. Each individual transfer is counted, so a bi-directional test will have twice the number of transfers as a uni-directional test.
File Transfers Failed The number of file transfers that did not exceed the pass/fail criteria for throughput.

2.14.6. Registration Lifetime Test Results

Mobile IP Re-registration Time The average Re-registration time of the mobile device. It is calculated based on the number of Mobile IP Registration retries received from the mobile device.
Mobile Proposed Lifetime The Registration Lifetime value received from the mobile device in the Mobile IP Registration Request message. The value should be less than or equal to the lifetime value in the Agent Advertisement message.

2.14.7. Data Ping Round-Trip Time Test Results

Average Round-Trip Delay The average round-trip time of all packets sent during the duration of the test.
Maximum Round-Trip Delay The maximum round-trip time of any packet sent during the duration of the test.
Minimum Round-Trip Delay The minimum round-trip time of any packet sent during the duration of the test.
Packets Lost The ratio of packets lost to the packets sent.

3. Troubleshooting Spirent Data

3.1. Overview

This Chapter provides information for troubleshooting problems with test execution. APEX C2K: Data was designed to make testing 3G CDMA mobile devices as simple as possible. However, as with any complex system, it is possible to encounter difficulty. If you encounter problems with the APEX C2K: Data system, follow the instructions given in the sections below. If the problem persists, contact your Spirent Representative for further assistance.

3.2. Initializing (Testing) HW

This procedure is performed by selecting all required instrument and clicking the Test button in the Instruments configuration dialog. It attempts to communicate with all required system hardware. If Spirent Data software or any control cables are incorrectly configured, it will be detected by this test. If this test fails, the following are the most likely causes:

- Required instrument HW is not enabled. Check the *Instruments* settings by selecting **Configure›Instruments**.
- Incorrect IP addresses have been selected. Verify that *Instruments* setting under the Configure menu matches the instrument configurations. Each instrument should have a unique IP address.
- Ethernet cables have not been properly connected to one or more instruments. Refer to the appropriate *Setup Guide* to ensure the cables are connected properly.
- One or more instruments (including the Cisco 2610XM Router) have not been powered-on.

3.3. “Underlying Connection was Closed” Error

During a test, TD-II test executive is required to communicate with the Spirent Data Remote Client (resident on the client laptop PC). The Client is responsible for call setup and initiating file transfers, as well as all other mobile-initiated actions.

When a *TestDrive APEX Failure* window displays, as shown in Figure 3-1, indicating that the underlying connection is closed, the TD-II test executive can no longer communicate with the Remote Client software.

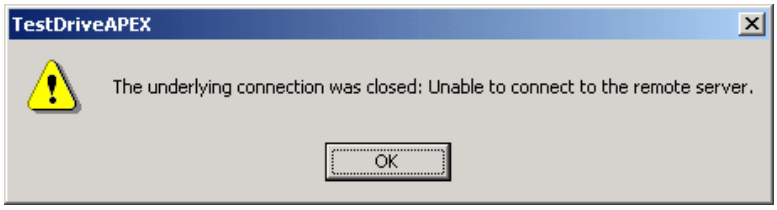


Figure 3-1: Spirent APEX Failure Window

This communication failure may have the following causes:

- Ethernet cables have not been properly connected to the Laptop PC or Cisco 2610XM Router.
- One or more instruments (including the Cisco 2610XM Router) have not been powered-on.
- Spirent Data Listener is not enabled or not responding. Follow the steps in Section 3.3.1 to re-enable the Spirent Data Listener.

3.3.1. Re-enable APEX Data Client Listener

APEX Data Client Listener is part of the APEX Data client that runs as a system service on the client laptop PC. It is designed to start automatically whenever the client laptop PC is started. To view the status of the APEX Data Client Listener service, select **Control Panel›Administrative Tools›Service**.

The *Data Client Listener Service* window displays, as shown in Figure 3-2.

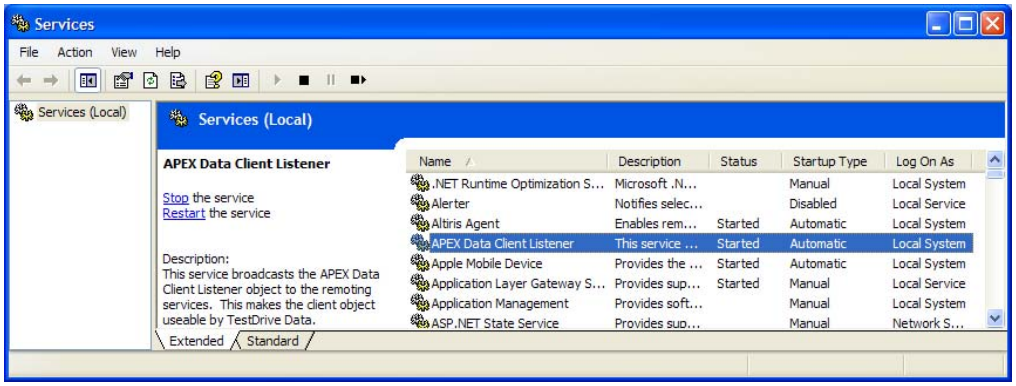


Figure 3-2: APEX Data Client Listener Service Window

Find the "APEX Data Client Listener" on the list of services; the Status column shows the current status of the service. If it is *Stopped*, restart it by selecting **Start** from the right-click menu. You can also click the **Play** or **Start** button on the toolbar.

If the "APEX Data Client Listener" is currently running, you may need to restart it for various reasons. Stop the service first by selecting **Stop** from the right-click menu. Then follow the steps above to restart the service.

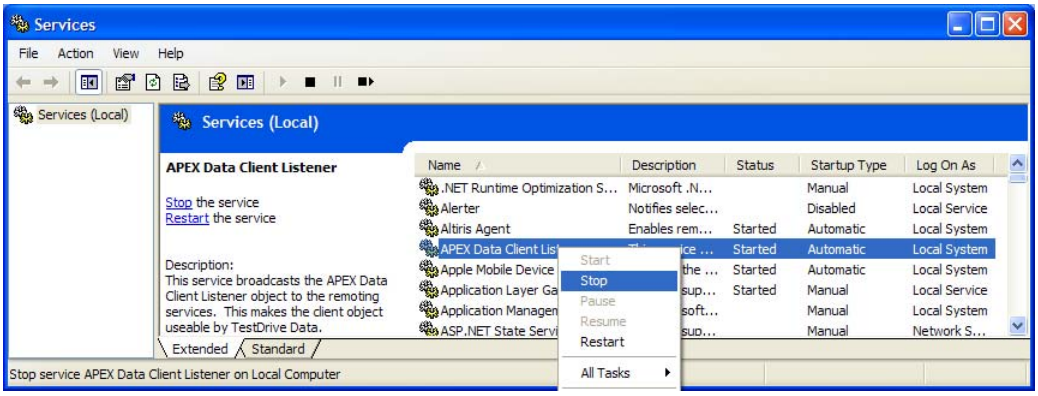


Figure 3-3: APEX Service Window – Data Listener

3.4. Failure to Establish Data Call

Most of the tests Spirent Data supports require you to establish a Packet Data Call. This is usually done through a Dial-up connection initiated at the Client PC. If the data call setup fails, the following are the most likely causes:

- USB/Serial Driver or modem driver for the mobile device is not configured properly. Consult your mobile device's driver installation instructions for information on how to install the proper drivers.
- Data (Dial-up) Connection is not configured properly. Make sure to follow the exact steps described in Section 4.3.4. of the *TestDrive II User Manual* for instructions on properly configuring the Data Connection for the mobile device under test.
- COM Port data rate is mismatched. Verify that the COM Port data rate of the mobile device matches COM Port data rate configuration of the Data Connection.

3.5. Fail to START File Transfer

Some of the tests that Spirent Data supports require you perform a file transfer with FTP/HTTP protocol. If the file/data transfer fails to START consistently, this could be caused by APEX Data Client Listener receiving an unstable state result from an unexpected driver error. Follow steps described in Section 3.3.1 to stop and restart the Listener.

3.6. Trouble Connecting to the SR3462

Verify that the two support applications are still running on the controller PC. In the task bar, you should see the following applications: *Start Naming Service*, and *untitled – server*. Check for error LEDs on the front of the SR3462. If there are any red LEDs lit, cycle power-on the SR3462 and wait for it to reboot. This should take about 4 minutes. When completed, all lit LEDs should be green.

4. Glossary

AAA – Authorization, Authentication and Accounting parameter

Access Network (AN) – The network equipment providing data connectivity between a packet switched data network (typically the Internet) and the access terminals; An access network is equivalent to a base station.

Access Terminal (AT) – A device providing data connectivity to a user. An access terminal may be connected to a computing device such as a laptop personal computer or it may be a self-contained data device such as a personal digital assistant. An access terminal is equivalent to a mobile station.

Advanced Mobile Phone Service – An American standard for analogue mobile and cellular telephony.

Algorithm Type and Version (ATV) –

AMPS – Advanced Mobile Phone Service

AN – Access Network

AOC – Advice of Charges

AT – Access Terminal

ATI – Access Terminal Identifier

ATV – Algorithm Type and Version

Auxiliary Pilot – An unmodulated, direct-sequence spread spectrum signal transmitted by an access terminal in conjunction with certain transmissions on the Reverse Traffic Data Channel. This channel provides an additional phase reference for the Reverse Traffic Data Channel for coherent demodulation and may provide means for improved signal strength measurement.

Base Station Controller (BSC) – Controls a set group of BTSs. Together the BTS and BSC systems are known as the BSS or Base Station System (BSS). The BSC is vital to the BSS system in that it ensures that subscribers can move freely from one cell to another with no loss in signal strength.

Base Station System (BSS) –

Base Station Transceiver Subsystem (BTS) or **Base Stations** – These make up the Mascom coverage area. They provide the clear transmission and clear reception of calls within a cell.

Basic Feedback Multiplexing Mode – At least one of the reverse CDMA channel carries feedback for forward CDMA channels corresponding to more than one sub-Active Set using unique long codes for the feedback channels associated with forward CDMA channels corresponding to each sub-Active Set. Overview 3GPP2 C.S0024-B v1.0.

BASS – Billing, Administration and Support System

BATI – Broadcast Access Terminal Identifier

BCCH – Broadcast Channel Control

BCE – Base Station Central Equipment

BPSK – Binary Phase Shift Keying

BREW – Binary Runtime Environment for Wireless

BSC – Base Station Controller

BSS – Base Station System

BTS – Base Station Transceiver Subsystem or Base Stations

CCBS – Completion of Calls to Busy Subscribers

CCF – Common Call Format

CCSD – Customer Care Service Desk

CDMA System Time in Slots – An integer value s such that: $s = \lfloor t \times 600 \rfloor$, where t represents CDMA System Time in seconds. Whenever the document refers to the CDMA System Time in slots, it is referring to the value s.

CDMA – Code Division Multiple Access

CDMA System Time – The time reference used by the system. CDMA System Time is synchronous to UTC time except for leap seconds and uses the same time origin as GPS time. Access terminals use the same CDMA System Time, offset by the propagation delay from the access network to the access terminal.

Cell – A physical grouping of one or more sectors that transmit the same power control command to an access terminal.

CGI – Cell Global Identity

Channel – The set of channels transmitted between the access network and the access terminals within a given frequency assignment. A Channel consists of a Forward Link and a Reverse Link.

CHU – Chargeable Units

CI – Cell Identity

CLI – Caller Line Identity (the caller's number displays on the called party's handset).

Connection Layer – The Connection Layer provides air link connection establishment and maintenance services.

CSPDN – Circuit Switched Public Data Networks

CUG – Closed User Groups

Dedicated Resource – An access network resource required to provide any data service to the access terminal.

Dial Up Networking –

DRCLock Channel – The portion of the Forward MAC Channel that indicates to the access terminal whether or not the access network can receive the DRC Channel and Reverse Link Channel sent by the access terminal.

DMU – Dynamic Mobile IP Key Update

DTE – Data Terminal Equipment

DUN – Dial Up Networking

Dynamic Mobile IP Key Update (DMU) –

EDGE – Enhanced Data rates for GSM Evolution; effectively the final stage in the evolution of the GSM standard, EDGE uses a new modulation scheme to enable theoretical data speeds of up to 384kbit/s within the existing GSM spectrum. A natural progression towards 3G services for operators. Also known as Enhanced GPRS (E-GPRS).

Effective Isotropically Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – The product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction.

EIR – Equipment Identity Register

EnhancedFeedbackMultiplexing mode – At least one of the reverse CDMA channels carries feedback for forward CDMA channels corresponding to up to four sub-Active Sets using one long code.

Equipment Identity Register – A central anti-fraud database which validates the IMEI number as calls are made on the Mascom network.

Evolution-Data Optimized or **Evolution-Data only** (**EV-DO** or **EV-DO** or **EV)** – A telecommunications standard for the wireless transmission of data through radio signals, typically for broadband Internet access. It employs multiplexing techniques such as CDMA (Code division multiple access) as well as Frequency division duplex (FDD) to maximize the amount of data transmitted.

FCS – Frame Check Sequence

FDD – Frequency Division Duplex

FDD-Paired – A forward CDMA channel and reverse CDMA channel pair where the [15] specification specifies the association between the forward CDMA channel and reverse CDMA channel.

Fixed Line – A land line or PLMN is the opposite of a wireless or cellular network. Currently in Botswana, Telecomms is the official fixed-line network (until such time as another, similar network emerges)

Forward Channel – The portion of the Channel consisting of those Physical Layer Channels transmitted from the access network to the access terminal.

Forward Control Channel – The channel that carries data to be received by all access terminals monitoring the Forward Channel.

Forward MAC Channel – The portion 1 of the Forward Channel dedicated to Medium Access Control activities. The Forward MAC Channel consists of the RPC, DRCLock, and RA Channels.

Forward MAC Reverse Activity (RA) Channel – The portion of the Forward MAC Channel that indicates activity level on the Reverse Channel.

Forward MAC Reverse Power Control (RPC) Channel – The portion of the Forward MAC Channel that controls the power of the Reverse Channel for one particular access terminal.

Forward Pilot Channel – The portion of the Forward Channel that carries the pilot.

Forward Traffic Channel – The portion of the Forward Channel that carries information for a specific access terminal. The Forward Traffic Channel can be used as either a Dedicated Resource or a non-Dedicated Resource. Prior to successful access terminal authentication, the Forward Traffic Channel serves as a non-Dedicated Resource. Only after successful access terminal authentication can the Forward Traffic Channel be used as a Dedicated Resource for the specific access terminal.

Frame – The duration of time specified by 16 slots or 26.66… ms.

General Packet Radio Service (GPRS) – Standardised as part of GSM Phase 2+, GPRS represents the first implementation of packet switching within GSM, which is a circuit switched technology and offers theoretical data speeds of up to 115kbit/s using multi-slot techniques. GPRS is the first step for 3G services as it introduces the packet switched core required for UMTS.

Global Positioning System (GPS) – A US government satellite system that provides location and time information to users. See Navstar GPS Space Segment/Navigation User Interfaces ICD-GPS-200 for specifications.

GMSC – Gateway Mobile Switching Centre

GPRS – General Packet Radio Service

GSM – Global System for Mobile communication. A European digital standard for mobile or cellular telephony

H-ARQ Bit or **Hybrid-ARQ bit –** The bit sent on ARQ channel in response to the 1st, 2nd, and 3rd sub-packet of a reverse-link physical packet to support physical layer ARQ.

HLR – The Home Location Register. The HLR and VLR are the key databases to the GSM system. Working with other call processing functions, the HLR provides the MSCs with information about the subscriber level, location and all available services.

HPLMN – Home Public Land Mobile Network

IMEI – The International Mobile Equipment Identity

IMSI – International Mobile Subscriber Identity

Integrated Services Digital Network – A digital network that provides access to a wide range of facilities.

International Mobile Equipment Identity – This is a security number specific to your handset. As soon as you make a call from your cell phone, the EIR validates your IMEI number. Should your phone be stolen, you should notify your Service Provider immediately so that the IMEI may be black- listed without delay.

ISDN – Integrated Services Digital Network

ISO – International Standards Organization

ITU – International Telephone Union

IWF – Interworking Function.

LAC – Location Area Code

L-ARQ Bit or **Last ARQ bit –** The bit sent on ARQ channel in response to the last sub-packet of a reverse-link physical packet to support MAC layer ARQ.

LMSI – Local Mobile Subscriber Identity

MAC Layer – The MAC Layer defines the procedures used to receive and to transmit over the Physical Layer. The MAC Layer is defined in Chapter 10.

MATI – Multicast Access Terminal Identifier

MCC – Mobile Country Code

MD – Mediation Device

ME – Mobile Equipment

MMS – Multimedia Messaging Service

MSC – Mobile Switching Stations or The Base Station Systems (BSSs) are grouped and Switching controlled by Mobile Switching Stations. The MSC forms the heart of the system and performs the following essential tasks: routes calls to and from mobile phones; controls the set-up and termination of calls; provides data for billing; acts as the link between Mascom and the public network (Telecomms). Finally, the MSC also controls hand-off between itself and other MSCs.

MSISDN – Mobile Systems International Subscriber Identity Number (on Mascom your MSISDN is your 71 cell number).

Multi-User packet – A single physical layer packet composed of zero or more security layer packets addressed to one or more access terminals.

NAI – Network Access Identifier

NCC – Network Control Centre

Network Access Identifier (NAI) – A standard way of identifying those who request access to a network.

Network Control Centre (NCC) – This gives the MASCOM Operations and Customer Service Departments a complete picture of what's happening in the network. It helps them with both trouble-shooting and longer-term network planning.

NULL – A value which is not in the specified range of the field.

OMC – Operations Management Centre

Operations Management Centre – From this control centre, MASCOM Operations is able to oversee a particular area of the network in great detail.

Operator Mascom – An "operator". In other words, the company or organization which owns and administers a telecommunications network

P-ARQ – Packet-ARQ bit

PABX – Private Automatic Branch Exchange

Packet-ARQ Bit – The bit sent on the ARQ channel in response to a reverse-link physical layer packet to support MAC layer ARQ.

Physical Layer Protocol – The Physical Layer Protocol provides the channel structure, frequency, power output, modulation, and encoding specifications for the forward and reverse links. The Subtype 0 and Subtype 1 Physical Layer is defined in 11, the Subtype 2 Physical Layer is defined in 12, and the Subtype 3 Physical Layer is defined in 13.

PKOI – Public Key Organization Index

PLMN – Public Land Mobile Network

Private Automatic Branch Exchange – The single switch or telephone exchange system which handles both internal and external telephone traffic.

PSTN – **P**ublic **S**witched **T**elephone **N**etwork

Public Land Mobile Network (**PLMN**) – A network that is established and operated by an administration or by a recognized operating agency (ROA) for the specific purpose of providing land mobile telecommunications services to the public. Access to PLMN services is achieved by means of an *air interface* involving radio communications between mobile phones or other wireless enabled user equipment and land based radio transmitters or radio base stations.

Public Switched Telephone Network (**PSTN**) – The network of the world's public circuit-switched telephone networks, in much the same way that the Internet is the network of the world's public IP-based packet-switched networks. Originally a network of fixed-line analog telephone systems, the PSTN is now almost entirely digital and now includes mobile as well as fixed telephones.

QAM – Quadrature Amplitude Modulation

QPSK- Quadrature Phase Shift Keying

Radio Link Protocol – Provides retransmission and duplicate detection for an octet aligned data stream.

RATI – Random Access Terminal Identifier

Reservation – Air interface resources set up by the access network to carry a higher layer flow. A Reservation is identified by its ReservationLabel. ReservationLabels are bound to RLP Flows that carry higher layer flows. A Reservation can be either in the Open or Close state.

Reverse Access Channel – The portion of the Reverse Channel that is used by access terminals to communicate with the access network when they do not have a traffic channel assigned. There is a separate Reverse Access Channel for each sector of the access network.

Reverse Access Data Channel – The portion of the Access Channel that carries data.

Reverse Access Pilot Channel – The portion of the Access Channel that carries the pilot.

Reverse Channel – The portion of the Channel consisting of those Physical Layer Channels transmitted from the access terminal to the access network.

Reverse Traffic Ack Channel – The portion of the Reverse Traffic Channel that indicates the success or failure of the Forward Traffic Channel reception.

Reverse Traffic Auxiliary Pilot Channel – The portion of the Reverse Traffic Channel that carries the auxiliary pilot.

Reverse Traffic Channel – The portion of the Reverse Channel that carries information from a specific access terminal to the access network. The Reverse Traffic Channel can be used as either a Dedicated Resource or a non-Dedicated Resource. Prior to successful access terminal authentication, the Reverse Traffic Channel serves as a non-Dedicated Resource. Only after successful access terminal authentication can the Reverse Traffic Channel be used as a Dedicated Resource for the specific access terminal.

Reverse Traffic Data Channel – The portion of the Reverse Traffic Channel that carries user data.

Reverse Traffic MAC Channel – The portion of the Reverse Traffic Channel dedicated to Medium Access Control activities. The Reverse Traffic MAC Channel consists of the RRI and DRC Channels.

Reverse Traffic MAC Data Rate Control (DRC) Channel – The portion of the Reverse Traffic Channel that indicates the rate at which the access terminal can receive the Forward Traffic Channel and the sector from which the access terminal wishes to receive the Forward Traffic Channel.

Reverse Traffic MAC Data Source Control (DSC) Channel – The portion of the Reverse Traffic Channel that indicates the data source from which the access terminal wishes to receive the Forward Traffic Channel.

Reverse Traffic MAC Reverse Rate Indicator (RRI) Channel – The portion of the Reverse Traffic Channel that indicates the rate of the Reverse Traffic Data Channel.

Reverse Traffic Pilot Channel – The portion of the Reverse Traffic Channel that carries the pilot.

RLP – Radio Link Protocol

Rx – Receive

Sector – The part of the access network that is identified by (SectorID, CDMA Channel).

SIM – Subscriber Identity Module

Single User Packet – A single physical layer packet consisting of one or more security layer packets addressed to one access terminal.

Slot – A duration of time specified by 1.66… ms.

SP – Service Providers

Sub-Frame – A sub-frame is a group of four contiguous slots. The start of a sub-frame is specified by (T FrameOffset) mod 4 = 0, where T is the CDMA System Time in slots.

Subnet Mask (of length *n*) – A 128-bit value whose binary representation consists of *n* consecutive '1's followed by 128-*n* consecutive '0's.

Sub-packet – A sub-packet is the smallest unit of a Reverse Traffic Channel transmission that can be acknowledged at the physical layer by the access network. A sub-packet is transmitted over four contiguous slots.

Subscriber Identity Module – The card, containing a micro-SIMCARD processor, which is inserted into the cell phone and which contains all the information you ask it to store. Your SIM also allows MASCOM, the GSM network, to identify you as soon as you make a call.

T2P – Traffic Channel to Pilot Channel transmit power ratio.

Tx – Transmit

TxT2P – Transmitted Traffic Channel to Pilot Channel transmit power ratio.

UATI – Unicast Access Terminal Identifier

Uninterruptible Power Supply – In the event of a power failure, the UPS ensures an uninterrupted power supply.

Universal Coordinated Time (UTC) – An internationally agreed-upon time scale maintained by the Bureau International de l'Heure (BIH) used as the time reference by nearly all commonly available time and frequency distribution systems.

Universal Diagnostic Monitor (UDM) – Software that allows developers, field and drive test teams, certification test teams and service providers to monitor and analyze the performance of CDMA mobile devices and networks

Universal Tool Suite (UTS) – A chipset-independent architecture that supports solutions for CDMA mobile device provisioning and analysis

UPS – Uninterruptible Power Supply

UTC – Universal Temps Coordinate. See Universal Coordinated Time.

Visitors' Location Register – Functioning in much the same way as the HLR, the VLR simply identifies roamers or visitors on the network.

VLR – Visitors' Location Register

WAP – Wireless Application Protocol